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January 1, 1895.

SAINT BARTHOLOMEW'S HOSPITAL REPORTS.

ANEURYSM OF THE ASCENDING PART OF THE ARCH OF THE AORTA

TAKING THE NATURAL POSITION OF THE HEART.

BY

SAMUEL GEE.

The following notes are published on account of the great infrequency with which such a form of disease occurs. Those aneurysms of the ascending part of the arch of the aorta which come to the surface and give rise to a tumour upon the front of the chest, spring from the right or convex side of the vessel, and tend, as they enlarge, towards the right. Exceptions to this rule must be very uncommon. I cannot pretend to have consulted more than a very small part of the enormous literature relating to the topic of aortic aneurysm, but so far as my investigation extends, I have found only one reference to a state of things contrary to that mentioned above as being the rule. Speaking of aneurysm of the ascending aorta, Oppolzer says (*Vorlesungen*. vol. i. p. 290), "that as to the situation of the tumour to the right of the sternum, this is undoubtedly the rule in the majority of instances, inasmuch as the aneurysms arise likewise, as a rule, from the convex side of the aorta. But, in exceptional cases, they spring not from the convex, but from the concave wall of the aorta, and then the said tumour is found not on the right, but on the left side of the sternum." To the best of my belief, no such case (excepting that now to be

narrated) has been observed at St. Bartholomew's during the past quarter of a century.

It will be seen that in my patient the aneurysmal sac took the natural position of the heart. During life I could not say where the heart was: it was found, at the examination *post-mortem*, to lie almost wholly to the right of the sternum. Questions of diagnosis, which arose in the course of the case, are referred to in the notes.

A man (Charles G.), aged 53 years, was admitted into Luke Ward on November 29, 1893. He was an iron-founder. He had never suffered from any previous serious illness: he denied syphilis, gout, and drink.

About the end of May 1893 he had a sudden attack of severe pain in the chest, during which he fainted. The pain did not continue. [Did this pain indicate the time at which the aortic wall first gave way?] About six weeks afterwards he began to suffer from similar attacks of pain at intervals of a few days. Of late the pain has been almost constant. His breath has come to be short during exertion; he has not suffered from palpitation of the heart or from hæmoptysis.

On admission he had the look of suffering. Putting my hand upon the part of the chest to which he referred the pain, I immediately felt that I had to do with something of a kind which was quite new to me, and which was beyond all my past experience. There was a low, rounded, smooth tumour stretching from the second to the fifth ribs on the left side between the sternum and the nipple-line. This tumour pulsated in a manner quite unlike the pulsation of the heart, and altogether like the pulsation of an aneurysm. The protuberance and pulsation were greatest in the third interspace. The pulsation was systolic. A blowing systolic murmur and a weak second sound were heard all over the tumour, and loudest where the pulsation was strongest. A faint systolic murmur could be heard in the back about the fourth and fifth dorsal vertebræ. No murmur could be heard by auscultation of the trachea. In the large arteries a systolic murmur could be produced, but not a diastolic. There was no tracheal tugging.

The position of the heart could not be ascertained. There was nothing like a cardiac impulse anywhere: there was no dulness to percussion to the right of the sternum.

The arteries were somewhat hard and tortuous: the pulse was 84, soft, and not jerking.

There were no signs of disease of the lungs or of any other organs. There were no signs of compression of any of the structures within the thorax.

I have already said that I had no experience to guide me as to the nature of this man's disease. That he had an aneurysm seemed certain: the difficulty lay in assigning a place of origin to the aneurysm. On the whole, it seemed to me to be most probable that he had an aneurysm of the pulmonary artery, for the signs were those which have been observed to occur in cases of that kind. But aneurysm of the pulmonary artery is an exceedingly uncommon disease; and we much more often meet with uncommon forms of common diseases than with uncommon diseases: such proved to be the case with our patient. An aneurysm of the heart, which could produce symptoms such as those narrated, seemed hardly worthy of being considered. Aneurysm of the descending aorta was thought to be very unlikely. And thus the disease was believed to be a pulmonary aneurysm. Examination *post-mortem* proved it to be an aneurysm of the ascending part of the arch of the aorta, springing from the left side of that vessel.

I need not describe the means which were adopted with the view of relieving his sufferings. He was most comfortable when lying somewhat over on to the left side.

The tumour and pulsating area slowly increased in extent, downwards and towards the left: by the end of May 1894 the pulsation was felt strongest in the fourth interspace, three-quarters of an inch within the nipple. Otherwise the signs were exactly the same as on admission. The protuberance became very tender. On June 23 he had a fainting attack which lasted about five minutes; he did not lose consciousness. He gradually became weaker, he was very much annoyed by a cough due to bronchial catarrh, signs of consolidation of the lower lobe of the left lung were observed, and he died quietly on June 30.

At the examination *post-mortem*, when the integuments were raised from the ribs, there was a perforation of the intercostal muscles, about the size of a shilling, in the fourth left interspace, just internal to the nipple and external to the costochondral joint. The under surface of the fourth rib close to the costochondral joint was much eroded for an inch and a half; the third rib likewise for about an inch. Removing the ribs there appeared, in what should have been the situation of the heart, a sac containing a soft gelatinous coagulum, pale yellow above and dark purple below; no doubt a clot formed since death; adherent to one part of the sac was a small quantity of old fibrinous deposit. A considerable portion of the front wall

4_ *Aneurysm of the Ascending Part of the Arch of the Aorta.*

of the sac was necessarily removed with, and indeed was formed by, the eroded ribs and the intercostal muscles. The true wall of the sac was thin but very tough. The heart was much displaced, so as to lie almost wholly to the right of the middle line; but the attitude of the heart, as it lay upon the diaphragm, was natural; in other words, the heart was pushed horizontally over to the right without the apex being tilted upwards or downwards. The pericardium was universally adherent. The finger could be passed through the aneurysmal sac into the left ventricle. The sac lay obliquely between the second right and the fifth left costochondral joint for a length of six inches and a half. Upwards, in the middle line, the sac reached the level of the first rib. Immediately above the sac, and lying on it, were the two innominate veins of about the natural size. No natural aorta was visible. Laying the sac open, it was found to be formed by dilation of the whole of the ascending part of the arch of the aorta, from the mouth of the innominate artery to the sigmoid valves. The clot removed from the sac measured seven inches.

The pulmonary artery was natural, and lay altogether behind the sac. The right ventricle of the heart was of natural size, the walls very thin, and the muscular substance rather pale. The left ventricle was of natural size, the walls flabby and wasted. The tricuspid, mitral and pulmonary valves were natural. The aortic orifice, natural in size, opened straight into the aneurysm. Beyond the innominate orifice the aorta was natural, except that it was very slightly atheromatous.

Both lungs were very adherent and cedematous; the lower lobe of the left was hepatised. The bronchi were not compressed. All the abdominal organs were natural.

ON PRIMARY CANCER OF THE PANCREAS.

BY

W. P. HERRINGHAM, M.D.

Primary cancer of the pancreas is a rare, but not a very rare disease. Seventeen cases have been examined *post-mortem* at this Hospital between December 31, 1882, and December 31, 1893, a period of eleven years, during which the total number of *post-mortem* examinations has been 3700; and I have myself examined two others at the West London Hospital, one of which I brought before the Medical Society.¹ Yet it is still as true as when, in 1881, Dr. Norman Moore² remarked it, that it has met with very little attention at the hands of medical writers. This is no doubt chiefly due to its unremunerative character. It hardly repays investigation. For, important though the organ undoubtedly is, it is strange how difficult it is to detect failure in its functions. Diagnosis is, as I shall hope to show, a matter of high probability in a great many cases; but for this we are dependent, not upon the properties of the gland, but on what we may almost call the accident of its position in the body.

Of the functions of the pancreas, the best established are (i.) the digestion of proteids, (ii.) the saponification of fats, and (iii.) the conversion of starch into sugar. But all of these are shared with other organs. The stomach also digests proteid, and even though there were a quantitative diminution in the amount digested, it would hardly be possible to estimate it. The bile also saponifies fat, and undigested fat may be passed with the stools in cases of obstructive jaundice without pancreatic disease.³ Lastly, starch is converted into sugar by the saliva.

Of late years the experiments of Minkowsky and v. Mering,⁴

¹ Proc. Med. Soc., vol. xii. p. 196.

² St. Barth. Hosp. Rep., vol. xvii. p. 205.

³ Halliburton, Chem. Phys. and Path., p. 699.

⁴ Trans. Internat. Physiol. Congress, Basle, 1889.

and the observations of Lepine¹ and others, have shown (iv.) that extirpation of the pancreas in dogs, and fibrosis of it in man, are accompanied by glycosuria. But this apparently depends upon some other cause than absence of pancreatic juice from the intestine, since it is not more than a very rare accident in cancer of the pancreas, even in cases where the pancreatic duct is obviously obliterated.²

Dr. T. J. Walker published³ two cases to show that the pancreatic juice was (v.) a necessary factor in the formation of the brown colour of the fæces, and that the bile alone is incapable of producing it. In his cases of obstruction to the pancreatic duct, the stools were white or whitish, even though there was no biliary obstruction and no jaundice. This test is, however, inapplicable in cases of primary cancer of the gland, since this nearly always affects the head, and obstructs both the biliary and the pancreatic ducts.

None, therefore, of these indications, however promising at the outset, are in practice found conclusive for the purposes of diagnosis, and we are thrown back upon other symptoms, derived partly from the anatomical position of the organ, and partly from the general consequences of cancer affecting the digestive organs.

I will here give brief details of the seventeen cases that have occurred in this Hospital. All are undoubted cases of primary cancer of the pancreas, with the possible exception of No. 10, in which the growth may perhaps have begun in the neighbouring glands, and spread by extension to the pancreas. I do not propose to enter into the pathological part of the question, partly because Dr. Norman Moore has already amply considered it, partly because it matters little at the bedside, either to patient or to physician, what form of carcinoma, or possibly of sarcoma, may be present. All have a like issue. Nor can they by their symptoms be differentiated during life. For the sake of larger numbers, I have collected a series of forty other cases for comparison with these. Da Costa⁴ drew up a *résumé* of thirty-five cases in 1858, but, on reading over his paper, it appears by no means clear that in all these the pancreas was alone or even first affected, and therefore, although his conclusions are not at all opposed to my own, I prefer not to compare his series with the present, but rather to leave it aside, and to take more recent cases in which the disease was certainly primary in the gland. The references to these cases I give at the end of this paper.

¹ Lyon Medical, 1890.

² This elementary fact appears to be still unknown in Germany, or at least to cause considerable surprise to the Society of Physicians at Berlin. See the Medical Week, vol. ii. p. 587, Nov. 30, 1894.

³ Med. Chir. Trans., vol. lxxii. p. 257.

⁴ North Amer. Med. Chir. Review, 1885, ii. 883.

The following are our own cases. In three of them the clinical notes are missing, but the *post-mortem* notes remain, and are to a certain extent useful for this inquiry:—

1. John H., 62 (John, Dr. Church, *d.* February 26, 1883).—No clinical notes.

Post-mortem.—Deep jaundice. Pancreas infiltrated with new growth throughout. Secondary growths in pleura and in liver. No note of gall-bladder.

2. Samuel S., 51 (John, Dr. Church, *d.* April 7, 1883).—No clinical notes.

Post-mortem.—Pancreas replaced by new growth. Liver small; no new growth. Gall-bladder distended, but bile can be squeezed out of papilla into duodenum. Secondary growth in stomach and in abdominal lymphatics.

3. Samuel C., 61 (Luke, Dr. Gee, *d.* July 10, 1883).—Previous history:—For four months belly swollen; for four weeks jaundice and pain in right side. On admission, April 28—Deep jaundice; May 5, vomiting began. There was ascites. Jaundice fluctuated, disappearing and recurring. June 22—No jaundice; emaciation.

Post-mortem.—Pancreas replaced by new growth. Liver and glands in hilum infiltrated by secondary growth. No note of gall-bladder.

4. John R., 64 (Matthew, Dr. Church, *d.* October 14, 1883).—No clinical notes.

Post-mortem.—Emaciation. Deep jaundice. Head of pancreas occupied by new growth; its duct greatly dilated. Papilla enlarged. Bile-duct dilated and filled with gravel. No note of gall-bladder. Liver deep green and very hard. "On cutting into it at any point, watery bile with grit floating in it flowed out." No secondary growth.

5. Caroline K., 56 (Hope, Dr. Andrew, *d.* May 4, 1884).—Previous history:—One month ago began to have continuous pain in abdomen; worse at night. Anorexia. No vomiting. Wasting. For ten days jaundice. On admission, March 25—A firm rounded tumour, thought to be adherent to the liver, below the ribs on the right side (probably the gall-bladder).

Post-mortem.—Pancreas infiltrated throughout with dense new growth, compressing the bile-duct. Liver contains numerous secondary nodules. No note of gall-bladder.

6. Patrick S., 55 (John, Dr. Duckworth, *d.* June 10, 1885).—Previous history:—Illness began at Christmas with vomiting and pain at epigastrium. Vomiting once a week ever since. On admission, March 24—Pale, wasted, jaundiced, liver slightly enlarged, gall-bladder distended. Ascites came on. After paracentesis a deep-seated tumour could be felt as well as the gall-bladder. Vomiting became very severe.

Post-mortem.—Pancreas reduced to a mass of very dense fibrous tissue. Carcinoma. Surrounding organs adherent. No secondary growths. Bile-ducts free. No jaundice. No note of gall-bladder.

7. William B., 67 (Matthew, Dr. Church, *d.* January 27, 1886).—Previous history:—For three months urine excessive. Thirst. For ten weeks pain in right hypochondrium, weakness, wasting. For three

weeks jaundice. No vomiting. On admission, December 7—Jaundice. Urine, sp. gr. 1035; contains bile and sugar. Four pints passed daily. No note of abdomen.

Post-mortem.—Head of pancreas filled with new growth. Gall-bladder enormously distended. Liver deep green and very hard. No secondary growth.

8. William C., 54 (Matthew, Dr. Church, *d.* March 23, 1888).—Previous history:—For ten weeks jaundice. Pain in right hypochondrium. Much wasting. On admission, January 11—Deep jaundice. Liver four inches below ribs in right mammary line. Gall-bladder distended.

Post-mortem.—Head of pancreas contained a new growth (size of walnut) pressing on common bile-duct. This and the gall-bladder were dilated. Liver 74 ounces. Numerous small secondary growths (size of pea), and a large mass near the neck of gall-bladder which obliterated cystic duct.

9. Anne G., 46 (Mary, Dr. Gee, *d.* September 28, 1888).—Previous history:—For three months aching pain in back and right side. A week later jaundice began. For two months noticed a lump on right side of abdomen. Much wasting. On admission, August 15—Deep jaundice. A tumour felt continuous with liver (probably the gall-bladder).

Post-mortem.—Head of pancreas enlarged and infiltrated by carcinoma. Secondary nodules in liver and in lumbar glands. Gall-bladder dilated.

10. Frank C., 63 (John, Sir D. Duckworth, *d.* September 9, 1891).—Previous history:—For fifteen weeks pain in back and abdomen and on right side. For three weeks jaundice. For ten days abdomen has been swollen. No vomiting. On admission, August 18—Some wasting. Jaundice. Ascites. Liver not felt. Later, a lump was felt in the epigastrium. Died of vomiting and exhaustion.

Post-mortem.—A large mass of new growth involving structures in small omentum and pancreas, and adherent to spine; it surrounded and pressed upon the bile-duct. Gall-bladder distended. No gall-stones. Liver wasted; contained two secondary nodules.

11. William B., 50 (Mark, Dr. Andrew, *d.* November 17, 1891).—Previous history:—For three months progressive weakness and wasting. Pain in epigastrium and in back. For one month jaundice. On admission, October 26—Liver nearly to level of umbilicus. Gall-bladder not felt.

Post-mortem.—Whole pancreas firm; head enlarged to size of orange by new growth. Bile-duct pervious. Neck of gall-bladder and cystic duct blocked with new growth. Liver 47 ounces, crammed with secondary growth.

12. William P., 54 (Matthew, Dr. Church, *d.* March 8, 1892).—Previous history:—September 1891, jaundice came on. Began to waste. For two months abdomen swollen. Vomiting now every night. On admission, February 10—Deep jaundice. Constant vomiting. Ascites.

Post-mortem.—Pancreas greatly enlarged, especially the head, by new growths. Secondary growths had involved the structures in the portal fissure, constricting the hepatic ducts and slightly compressing the bile duct. A few secondary nodules in liver. Gall-bladder and cystic duct natural.

13. James M., 57 (Mark, Dr. Andrew, *d.* July 16, 1892).—Previous history:—One year ago had constant vomiting for some months. Twice vomited blood. Quite recovered. Five weeks ago vomiting again began, and lasted two weeks. Then abdomen began to swell and he to waste. On admission, May 17—Ascites. Tumours felt in epigastrium on liver. No jaundice.

Post-mortem.—Carcinoma size of orange occupying head and body of pancreas. Large secondary growths in liver. No note of gall-bladder.

14. Catherine H., 54 (Hope, Dr. Andrew, *d.* July 22, 1892).—Previous history:—Since last Christmas has had pain in epigastrium. For one month it has been worse. Vomiting. Wasting. Jaundice. On admission, June 28—Ascites. Liver very tender. July 17—Liver to level of umbilicus. No tumours palpable.

Post-mortem.—Scirrhus carcinoma occupying head and body of pancreas. Liver large, containing a few secondary nodules. Bile-duct dilated. Gall-bladder of normal size.

15. William B., 48 (Luke, Dr. Gee, *d.* January 31, 1893).—Previous history:—June 1892, nausea and vomiting began; in July jaundice. Three weeks ago sudden pain in region of liver. On admission, January 20—Not much wasting. Deep jaundice. Liver enlarged. Gall-bladder distended. Cholecystotomy was performed, but no stone was found.

Post-mortem.—Diffuse growth in head of pancreas, and in some part of its body. Numerous secondary nodules, none large, in liver. No gall-stones anywhere.

16. Joseph E., 57 (Mark, Dr. Church, *d.* October 11, 1893).—Previous history:—For three months pain in abdomen, and wasting. For three weeks jaundice. Admitted September 1. September 23—Liver found enlarged and gall-bladder distended.

Post-mortem.—Hard cancer of pancreas. Great distension of bile-duct. Gall-bladder distended. Secondary growth in liver.

17. Henry B., 58 (John, Sir D. Duckworth, *d.* December 29, 1893).—Previous history:—For four months dull aching pain across stomach. Worse at night. Frequent evening vomiting. Rapid wasting. On admission, December 9—Slight jaundice. Very large liver, covered with bosses.

Post-mortem.—Head of pancreas infiltrated with new growth. Secondary growths in omentum and mesentery. A large mass in hilum of liver. Liver 150 ounces, crammed with secondary growths.

It is first of importance to notice that in these cases the disease occupies chiefly, or even solely, the head of the pancreas. Cancer of the body or tail does sometimes occur alone,—we have had a case of it in the last twelvemonth,—but it does not, or at any rate need not, produce the same train of symptoms as disease of the head, and it is unrecognisable. The following remarks apply therefore only to the usual form of pancreatic cancer in which the head of the gland is concerned.

These patients—like most patients with malignant disease—are beyond middle age, and there are fourteen men to three women. In the forty other cases that I have collected, one

patient was a little girl of two years old, a quite exceptional instance; three were between twenty and thirty years, four between thirty and forty, five between forty and fifty, and twenty-eight were over fifty years old. There were twenty-seven males, twelve females, and one whose sex is unrecorded.

The duration of the disease from the first symptom is short. Of fourteen cases two (Nos. 14, 15) lasted seven months; three (Nos. 3, 6, 12) lasted six months; six (Nos. 7, 8, 9, 10, 16, 17) lasted less than six and more than four months; two (Nos. 5, 11) lasted less than four months, and in one the date of onset was doubtful. In the larger series twenty lived not longer than four months from the first symptom. Two cases¹ lived no longer than three weeks from the first definite onset.

The first symptom was in most cases pain. In three cases (Nos. 9, 10, 14) it was the only symptom of onset. In four others (Nos. 5, 6, 13, 17) it occurred together with digestive symptoms, anorexia or vomiting. In one (No. 8) jaundice and pain began together. In two others (Nos. 11, 16) weakness and emaciation began at the same date as the pain.

In one case (No. 3) swelling of the abdomen, in one (No. 7) diabetes, in one (No. 12) jaundice, and in one (No. 15) nausea and vomiting were the initial symptoms.

Pain is referred to three situations, often to each of the three at various times by the same patient, namely, to the back about the upper lumbar vertebræ, to the right hypochondrium, and to the epigastrium. In two cases (Nos. 12 and 13) it is not mentioned at all. When pain was referred to the right side alone, as in Nos. 3, 8, 9, it was closely connected with the appearance of jaundice, and may, therefore, with some probability, be referred to the biliary obstruction. This is not the case when, as in Nos. 7 and 10, the epigastrium and back are at the same time the seats of pain.

The pain is of a dull, aching character, and usually bears no relation to food. In one case, however (No. 15), there was sudden and severe pain in the right side, which lasted three hours, and left tenderness for a week. Cholecystotomy was performed on this patient, but no stone was found. In one case (No. 13) the pain was worse after food, and was relieved by vomiting; in two (Nos. 5 and 17) it was worse at night.

Digestive symptoms are common. Anorexia is mentioned but seven times, and twice late only in the disease. A special distaste for fats is not once noted. Vomiting is very variable. In two cases (Nos. 6 and 13) it was an initial symptom, and continued till death; in another (No. 12) it occurred early, but is

¹ Isch-Wall, Johnson.

not exactly dated; during the last month of life in this case it was constant. In two cases (Nos. 15 and 17) vomiting occurred at the onset, but stopped very quickly; in others (Nos. 3, 5, 9, 10, 14, 16) it was a late symptom, and occasional merely; in three (Nos. 7, 8, 11) there was none. Diarrhoea is uncommon before the last two months of life. In six cases there was none at all until just before death; in three cases (Nos. 7, 8, 14) the bowels were moved twice, thrice, or four times daily while in Hospital; in three cases (Nos. 6, 10, 12) there were periods of distinct diarrhoea. Bloody stools, or stools with altered blood in them, are occasionally passed. This is due to erosion or ulceration of the duodenal papilla after it has been infiltrated with the growth. Fat can be sometimes seen in the stools either as liquid oil or as a solid. This is, however, rather a rare symptom, and intermits even in those cases which present it. The microscope detects it when the eye cannot, as in one of my own cases, but is not employed often enough or regularly enough to give an idea of the frequency with which fat in this minute form occurs.

Emaciation is almost invariable and great. But there are exceptions even to this rule, and two cases of the larger series¹ showed considerable increase of fat—the latter getting very fat in the course of the disease.

Ascites occurred in six cases (Nos. 3, 6, 10, 12, 13, 14).

The pancreas lies so deep that a tumour must grow to a large size, or the abdomen must be extremely thin and flaccid, to allow of its palpation. It was, however, detected in two cases of this series, in No. 6 after paracentesis, and in No. 10. The tumour was felt in seven of the other forty cases.

The liver is generally enlarged. In three cases (Nos. 3, 5, 10) it was not felt; in six (Nos. 6, 9, 12, 13, 15)² it was enlarged, but not very greatly so; in five (Nos. 8, 11, 14, 16, 17) it was very large. In some of these cases (Nos. 11, 13, 17) large secondary growths were felt during life, and were no doubt the chief cause of the enlargement; but in others, and some of these the largest (Nos. 8 and 14), the secondary growths were small or absent. In these the enlargement is due to the obstruction of bile. Some of these cases show subsequent diminution in size owing to a cirrhosis brought on by the biliary obstruction, and Dr. Moore³ is inclined to lay some stress upon this symptom as a means of diagnosis.

Jaundice nearly always occurs at some time or other. In one

¹ Garnier, Trower.

² I have not always mentioned the enlargement in the abstract.

³ *Loc. cit.*

of the Hospital series it was the first symptom. It was present in fifteen out of the seventeen:¹ in one case (No. 17) it was slight, and in one (No. 6) it fluctuated, but in the others it was constant and deep. It is obviously obstructive in character, and the site of obstruction is in the majority of cases indicated by enlargement of the gall-bladder. Into the cause and value of this enlargement, which I consider the most important of all the special symptoms of the disease, I propose to enter at some length.

The bile-duct comes into contact with the head of the pancreas about half an inch after its formation. It passes down between this organ and the duodenum for the rest of its course. During the first half inch it lies in the lesser omentum, and passes behind the first part of the duodenum.

Now enlargement of the gall-bladder may be due—

- (i.) To a tumour growing in it.
- (ii.) To obstruction of the bile-duct from a calculus, or to a valvular calculus in the cystic duct permitting ingress, but preventing egress, of bile.
- (iii.) To a tumour growing in the bile-duct, or in the papilla at its mouth.
- (iv.) To compression of the bile-duct from without.

(i.) According to Musser,² the palpable tumour in these cases is not usually due to dilation, but is the growth itself. If this be the case, it is to be expected that the tumour would be harder, more irregular, and tenderer than a dilated gall-bladder is. It is also more likely to be fixed by adhesion to its surroundings. Of these points I have no personal experience. Musser's own case presented no tumour. I have found four cases of this disease in the Hospital records during these eleven years. In one only was a tumour palpable, and in this case there is some reason for believing that it was not the gall-bladder itself, but a secondary growth in the liver that was felt. Its characters are, however, not noted with sufficient accuracy to make this certain.

(ii.) In the second class, of which I have again not seen an undoubted instance, it is to be expected that there would be a history of biliary colic. This can usually be distinguished, first, by its severity, and secondly, in most cases, by its recurrence from the pain of pancreatic cancer.³

(iii.) Cancer sometimes begins in the bile-duct, or at its opening into the duodenum. These cases are indistinguishable

¹ The exceptions are No. 2, where no note is made of its existence, but where it may be inferred from the distension of the gall-bladder, and No. 13.

² Boston Med. and Surg. Jour., vol. cxi. pp. 525, 553, 581.

³ The converse, however, is not always true. In case No. 15 the attack of pain closely resembled biliary colic.

from those of pancreatic cancer. They are, however, much rarer. Only three cases have occurred here during the period I have examined, and even of these one may perhaps have originated in the pancreas. I transcribe the following case to show the resemblance between the two diseases:—

Mary B., 58 (Elizabeth, Sir D. Duckworth, *d.* February 14, 1888).—Previous history:—Three months ago jaundice began, preceded by nausea and vomiting. No history of biliary colic. On admission, January 6—Much jaundice. Stools chalk-coloured. Gall-bladder distended. Rigors supervened, accompanied by rambling delirium, and a purpuric rash appeared on the legs. Death took place by exhaustion.

Post-mortem.—The liver was large. The gall-bladder was distended, and contained stones. The bile-duct was blocked about two inches above its duodenal end by an encephaloid cancer. There was great dilatation of all the ducts above the obstruction.

(iv.) The duct may be compressed from without in the first part of its course by the glands in the lesser omentum. But if so, they will almost certainly compress the hepatic ducts too, in which case there will be no distension of the gall-bladder. I have never seen a distended gall-bladder in such a case, though jaundice from this cause is not at all uncommon.

In the second part of its course, that between the duodenum and pancreas, compression will almost certainly be due to tumour of the pancreas, for tumour of the duodenum alone is exceedingly rare, and there is no other organ which can reach it.¹

The jaundice in these cases is, as I have said, usually both constant and deep. But after death a probe can often—in all the cases that I have myself seen—be passed from the duodenum up the duct without difficulty. In other words, the duct is compressed, but not occluded. This explains why, as in case No. 3, the jaundice sometimes lessens in intensity or disappears. Some alteration in the growth, perhaps some contraction of the fibrous tissue in it, takes off the pressure and leaves the tube more free. It must be remembered, however, that a brownish colour in the fæces may be due to altered blood. This was found, and determined spectroscopically, by Dr. Lewis Jones in the case which he has communicated to me.

Dilatation of the gall-bladder is, unfortunately, not always present. Attention was called to it by Da Costa, and great stress was laid upon it by Bard and Pic.² It occurred in nine

¹ It is possible that the opening of the duct may be constricted by the contraction of an ulcer caused by gall-stones. If this occurred, there would probably be a history of biliary colic. A simple duodenal ulcer, if it occurred so unusually low as the papilla, might have the same effect. But these cases are so rare that as a source of error they may be neglected.

² *Rev. de Med.*, vol. viii. p. 257.

cases of the Hospital series (Nos. 2, 5, 6, 7, 8, 9, 10, 15, 16); it was certainly absent in three (Nos. 11, 14, 12), and it is not mentioned in five (Nos. 1, 3, 4, 13, 17). Of those in which it was absent, two (Nos. 11, 12) showed large growths blocking the cystic or hepatic ducts, and thus preventing the influx of bile into it. It is true that a growth blocking the cystic duct does not always prevent enlargement of the gall-bladder. In case No. 8, for instance, the two conditions co-existed. But it is reasonable thus to explain the absence of distension in cases Nos. 11, 12. Case No. 14 does not, as recorded, admit of this explanation. In case No. 13 there was apparently no obstruction to the duct. Four remain in which no note is made of the condition of the gall-bladder, and in one of these (No. 17) the large mass in the hilum of the liver renders it probable that the gall-bladder was not dilated.

In the forty other cases, if the *post-mortem* notes be included, the gall-bladder is found to have been greatly distended in no less than twenty-three cases. But in several of these there is no mention of it in the clinical notes. In four other cases it was not palpable in life, though greatly dilated at the *post-mortem* examination. In five cases it was not enlarged either before or after death, and in eight it is not mentioned.

Dilatation occurs then in considerably more than half of the cases, and it is allowable to expect that if the importance of the symptom were recognised, there would be more frequent record of it in the clinical notes.

The bile which it contains is always thick and dark, even though the ducts within the liver be filled with a much paler and more watery fluid.

The conclusions to which I have come are:—

(i.) That when a patient who suffers from deeply-seated pain in the epigastric or hepatic region, along with progressive emaciation, but without signs definitely indicating gastric cancer, has jaundice and dilatation of the gall-bladder without a history of biliary colic, by far the most probable diagnosis is that he has primary cancer of the pancreas, and that this diagnosis is not much affected by the state of the liver, which may be large or small, and may or may not contain palpable cancerous growths.

(ii.) That if the gall-bladder be not dilated the diagnosis must remain uncertain.

I append references to the forty cases that I have used for comparison. There are several others recorded in journals to which I have no ready access.

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NOTES ON CHLOROFORM-ANÆSTHESIA.

BY

RICHARD GILL.

There is a wonderful variety of phenomena exhibited by patients under the influence of chloroform; and these depend, in my opinion, not upon the varying action of chloroform itself, but the different conditions affecting the patients. The proper study of these conditions is essential, therefore, to the successful administration of chloroform.

Those who are about to be submitted to operation (or to examination with a view to operation) are either in their usual state of health, or else suffering from some local or general disturbance. But there are many differences amongst those commonly regarded as normal. There are, for example, the sanguineous and the lymphatic. The former uniformly take chloroform well; the latter manifest, on many occasions, a marked tendency to depression. And the explanation is to be found in the fact that this class of patients—the more especially when they are young—do not easily withstand the effects of hæmorrhage, which occurs in less or greater degree in all operations. It is judicious in this sort of healthy person, and more especially in those operations which are likely to be associated with rapid loss of blood, as in the removal of adenoid growths, to anticipate this depression by the previous administration of ether. More blood is lost as the result of ether-stimulation, but the heart is placed in a more advantageous position when it is called upon to overcome the consequent depression of sudden hæmorrhage. And it is interesting to contrast this effect of hæmorrhage during chloroform-anæsthesia of the lymphatic, with the almost imperceptible result of an equal or greater degree of it in those who are full-blooded. I mean, of course, as to the immediate effect. The full-blooded feel the depression later on, and if enough blood has been lost to lead the administrator to anticipate subsequent faintness, he should proceed at

once, before the state of the patient be aggravated, to give a rectal injection of brandy and beef-essence.

The age of the patient has a relation to the amount of chloroform used. The younger the patient the less, the older (limited to fifty on an average) the greater the quantity needed to effect and maintain anæsthesia. Thus 5iv. were required to keep a child aged 4 anæsthetic with a pin-point pupil for one hour, while in the case of a woman aged 23, 3x. were consumed, and in that of a man aged 35, 3xiii. during the same time. These three cases are taken from the same week during the past summer, so as to neutralise as far as possible the disturbing influence of varying temperature on the volatility of chloroform. When any circumstance intervenes to alter the normal amount or quality of the blood, it has an influence on the amount of the agent, both in inducing anæsthesia and in maintaining it. Thus in the full-blooded a larger quantity is requisite than in those of the same age, height, and vigour, but less in weight; while in the anæmic a smaller amount achieves the desired result. Thus it is seen that the amount of chloroform necessary to induce and maintain anæsthesia varies directly with the weight of the blood. The action of chloroform is primarily on the blood, and it is necessary for it to circulate in a certain proportion in order to achieve the temporary suspension of the cerebral functions which is called anæsthesia, and which is characterised in normal cases by the presence of the pin-point or contracted pupil. If chloroform be allowed to circulate in a larger proportion, then the measure of anæsthesia is lost; the blood, instead of being safely, becomes dangerously affected; nutrition is impeded, and hence the heart and the medullary centres, along with the rest of the bodily tissues, are deprived of healthy nourishment. Their powers being already weakened, and still further weakened by this continued excessive action of chloroform, the life of the patient hangs on the initial vigour of his heart. If this organ be incapable of overcoming the resistance in front brought about by the obstacle in the capillary circulation (arising from the diminished amount of oxygen in the blood) and the extra-burden thrown upon it from behind, the tension in the pulmonary arteries leading to distension of its right cavities, sooner or later it will stop. And if a diseased heart or a malformed heart be very sensitive to any, even the slightest disturbance of its nutrition, it is clear that its functions may suddenly cease, either during the induction of anæsthesia, when it is almost impossible to prevent a slightly excessive action of the agent, but which happily is unattended with danger in the vast majority of weak hearts, or some time during

the stage of anæsthesia, whenever the anæsthetic dose of chloroform in the blood becomes, after an interval of minimum disturbance, prejudicial to its existence. And thus, when the heart ceases to beat, the respiratory centre is still active. But if, on the contrary, the heart be resistant, the cumulative effects of chloroform in the blood lead to respiratory paralysis. In this case, the heart may still beat while the breathing is at rest, and it may or may not be capable of being restored by artificial means. Chloroform may bring about death suddenly at the lungs when it is rashly administered. Here it causes asphyxia, just like any other mechanical impediment to respiration.

The following variant in the course of anæsthesia is one of the first importance. It may be described thus: While the patient continues anæsthetic, his resistance to the action of chloroform diminishes. For example, during the second ten minutes, 3iii. were consumed, the pupil being pin-point; during the seventh ten minutes the quantity was gradually reduced to 3iss., the pupil being still pin-point. Had the same amount been used during each successive period of ten minutes, the pupil would have been dilated, showing not the anæsthetic, but narcotic action of the agent. And it is desirable in all long operations to depress the patient by means of chloroform to the smallest degree possible. If chloroform circulating in the blood tend to the deterioration of cell-organisms from malnutrition, it is evident the smaller the quantity consumed the less will the patient be affected. It may be urged against this diminishing resistance of the patient, that the result of the operation is a sufficing cause of the depression which occurs during protracted operations. But though this may be at times a very powerful cause, and one which has to be treated independently, it is not the sole cause. For this diminishing resistance occurs in a very pronounced manner when the operation is a slight one but is prolonged. A similar procedure is followed on the occasion of sudden hæmorrhage. Here, less blood being under the altered conditions in circulation, less chloroform is needed to keep up anæsthesia.

Of the local abnormal conditions, the heart and lungs require chief consideration. In both, the greatest care has to be exercised in anæsthetising the patient. If there be any error in this respect, there will be encountered the risk of throwing undue tension on the right side of the heart, or else of impeding the already burdened respiratory machine. Should struggling take place as the result of this (and it is to be remembered it may be voluntary), free access to air is to be allowed. And

when quiet is restored, a second attempt should be made. If, in such instances, the patient express some fear as to the capabilities of his heart, there can be no objection to his taking a little brandy previous to the operation. If nothing else, it sometimes does good by relieving an anxious mind. When the patient's position is altered, as from the back to the side, as in cases of empyema, the effect of the change on the sound lung has to be anticipated. For respiration is mechanically impeded through pressure on the sound side. Hence it becomes necessary to reduce the quantity of chloroform, lest temporary obstruction result from the relative overdosing of the working lung.

The general abnormal states of the body which call for notice in connection with chloroform are anæmia, fever, and emaciation; in the last-mentioned group are included the cases of chronic drunkards, whose tissues have already become ill-nourished.

Here the single characteristic is the sensitiveness of the pupil. When anæsthesia is attained, the pupil is found to be widely dilated, and, with a tendency to slight contraction with air, it remains so for a varying period, the longest in my experience being thirty-five minutes. It then contracts, and remains contracted up to the end of the operation. Knowledge of this phenomenon is of paramount service to the administrator. For here the pupil is lost as the measure of anæsthesia (like as in squint operations, when the pupils are dilated by atropine), and he is driven to throw all his attention on the state of the respiration and character of the pulse. The pupil, too, is to be examined from time to time, and it must always react very readily to light and contract with air.

In cases of fever, more chloroform is used than in normal cases. This does not mean that the feverish patient is more resistant to chloroform—that the blood is more highly charged. The quantity is larger simply because chloroform is passed into and out of the system with a rapidity corresponding to the abnormal frequency of respiration. The following case is an illustration. $R=60$, $P=120$, $T=105.6^{\circ}$, in a female, 24, with acute septicæmia. Duration of anæsthesia, one hour; amount of chloroform taken, 3xx. The same patient, under normal conditions, would have required from 3x.—3xii.

On the other hand, those patients who have wasted from any cause, and in whom all the vital functions of the body work at low pressure, take less chloroform than when they are in the full sway of health. In some of these, notably those who have suffered a long time from hip-disease or internal cancer, there

is a tendency to decline of the breathing, however small may be the amount, and however gradually the chloroform may be given. The procedure to adopt in this circumstance is to stimulate the respiration, either by pressure upon the chest-wall, or gentle rubbing along it in the course of Bell's nerve. The administration should not, of course, be continued if the breathing be inadequate; and the rule is to be adopted in this, as in other parallel cases, namely, to vary the amount of chloroform directly with the efficiency of respiration.

The question is oftentimes put, Is it proper to endeavour to chloroform a patient when he is under the depressant influence of fear? The answer is—Not under any circumstances. Wait till he recovers, and in the interim do everything to bring about a state of calm and confidence. When the breathing has been restored to an efficient state, then commence the administration. As the patient gradually becomes influenced by chloroform, it will be noted that the pulse improves in quality. Sometimes depressed by the agency of mental emotion, it is now, under chloroform, stronger, fuller, and its beat less frequent; but not, be it remarked, as a direct consequence of chloroform. The pulse during chloroform-anæsthesia (always provided the heart be sound in structure and regular in function) is generally slightly reduced in frequency, the beat being more vigorous, so that what it loses in rapidity it gains in strength. Now when there are two causes at work, it is sometimes difficult to define the exact limits of their combined effects. But the scope of their individual operation may be broadly determined. The emotion of fear through the cardio-inhibitory centre causes the heart to beat rapidly and weakly. In a fearful patient we have the effects of this emotion beginning to disappear. Chloroform is administered and the pulse from 96 is reduced to 64 by the time anæsthesia is attained. But chloroform reduces the frequency of the heart's action; not to this extent, however, as seen in normal cases, when the pulse being 70 is reduced to 64 in the generality of cases. It is by removing the waning influence of the cardio-inhibitory centre that chloroform achieves this rapid fall, and it does this by suspending the action of the emotional centres in the brain. Its action, therefore, is secondary in this respect and not primary. There is, too, another peculiarity associated with the phenomenon of fear. The pupil is dilated, and remains dilated during the period of induction, and for a little while during anæsthesia. It then suddenly contracts. This is opposed to the course of events in those cases in which anæsthesia is effected with a dilated pupil. In them it contracts slowly,

indicating a slight overcharge. The sudden contraction of the pupil, therefore, indicates the final release of the medullary centres from the influence of cerebral control.

In the very young it is not expedient to wait so long, partly because the emotion of fear does not exercise the dangerous immediate effects it may have in the adult, and partly because they do not possess so great a power over respiration. It is in young children, however, that the breathing has to be closely watched. If a child has been crying overmuch, the respirations become irregular, and long deep inspirations occur. If chloroform be dropped on to lint immediately before such an occurrence, there is the risk of too much being suddenly taken into the lungs, and a temporary obstacle to respiration created. Under such a circumstance the chest is to be emptied artificially as soon as possible.

Pallor may be present during induction and in the course of anæsthesia. It is caused (1) by inefficient administration, the patient not being gradually and increasingly deprived of the powers of will, emotion, and sensation, but subjected to an irregular succession of rises and falls; and (2) by changes in the nervous mechanism presiding over the stomach. This cause is oftentimes seen in action in surgery patients where there has not been the same care in preparation as in ward cases. Nearly always there is some dilatation of the pupil associated with pallor when resulting from direct irritation of the vomiting centre. Sickness may take place and the stomach be emptied without any change in the state of the pupil, the circulatory and respiratory system, excepting the respiratory arrest (and venous congestion following it) immediately before the contracting of the stomach. Here the vomiting centre is set into action by reflex impulses from that organ. But when the patient becomes pallid, and remains pallid for some time, the breathing retarded perhaps, with some irregular action of the abdominal muscles, the pulse weak and quick, a few beads of perspiration collecting on the upper lip—when these phenomena are present with a dilated pupil, it has occurred to me to ascribe their origin not to the stomach indirectly, but directly to the vomiting centre itself. This vaso-motor depression is most frequently seen in those of a neurctic temperament, and is caused, I believe, by mental impulses acting upon the vomiting centre in the medulla. There is never any actual discharge of the contents of the stomach, if any; but there is much retching, and it is prevented, like an ordinary hiccup, by holding the breath.

The pupil may be dilated when the stage of unconsciousness

is reached. The causes of dilatation are—(1.) Struggling; (2.) stomachic disturbance; (3.) fear; (4.) some general abnormal condition, as pyrexia, anæmia, emaciation; and (5.) an overdose of chloroform. In the last case, resort should at once be had to air until contraction occur. It is readily separated from the first three causes by its sluggish reaction to light. The other points of distinction are—(1.) Absence of the brilliancy of eye; (2.) the cornea losing its lustre; (3.) the breathing laboured; (4.) the pulse full and the veins distended. In the other instances the eye still retains its brilliancy (excepting where struggling is temporarily associated with an overdose), and the pupil readily reacts to light. During anæsthesia the pupils may be dilated—(1.) By a gradually increasing overdose; (2.) stomachic disturbance; (3.) some consequences of the operation; (4.) faintness. Great care is necessary to guard against the occurrence of (1). It is brought about by a neglect of the law of diminishing resistance, and its progress may be so slow, the breathing may be so little affected relatively to successive short periods of time, the extraordinary muscles of respiration come into the field of action with so very little display, that the observation of the administrator, unless matured by long experience, is cheated, and did he rely upon the breathing alone, the issue would undoubtedly be calamitous. It is here that the value of the small pupil is seen in all its importance. While the breathing is becoming almost imperceptibly embarrassed the pupil is slowly dilating. It is not readily sensitive to light. Now, instead of continuing the administration, the patient should be allowed air until contraction of the pupil takes place, indicating the return from the dangerous zone of narcosis to the level of safe and secure anæsthesia.

Severe hæmorrhage during operation will dilate the pupil. So also undue and prolonged tension. And when the latter is unavoidable, the precaution should be taken of immediately reducing the amount of chloroform given. In a remarkable example of shock during operation (cutting the cord in removal of the testis), the patient, who had chloroform administered to him on account of the state of his lungs, was in a moment of time rendered all but lifeless. There had been no previous manifestation of anything abnormal. The pupil was contracted up to the moment of sudden dilatation. There was no blackness of the blood, but the surgeon was puzzled by the sudden cessation of hæmorrhage. The head of the patient was at once lowered and the lower jaw drawn forward. Respiration was

not entirely stopped, the abdominal muscles acting regularly, but at prolonged intervals, and feebly.

The residual chloroform in the chest was at once got rid of by compressing the lower ribs, and the patient subsequently made a rapid recovery. Why was artificial respiration had recourse to? Because in such instances, when there is interference with the efficient outgoing of chloroform, there is the tendency to the absorption of a relative overdose of the agent. Were the breathing free, the amount of the vapour would be harmless; but under the new conditions, chloroform being absorbed and diffused too quickly and expelled too slowly, the organism, already depressed, is subjected to a new source of depression, from which serious consequences might ensue, and which must always retard the process of recovery.

What is the best sign to be guided by when chloroform is administered? This is a question which does not admit of a general answer, because different rules have to be obeyed during the induction of anæsthesia, during short and long anæsthesia, and also when alterations are made in the patient's position. This much, however, may be stated concerning the induction of chloroform-anæsthesia—the pulse may be ignored, but respiration is to be assiduously watched. How do we know that the patient is unconscious? By the alteration which the breathing undergoes: it is no longer controlled by the will; it has become automatic. But the patient being unconscious, how do we measure the amount of chloroform which is safe for the purposes of continued anæsthesia? By the size of the pupil. Sometimes the pupil is large, sometimes small, when unconsciousness is induced. The large pupil may mean narcosis; the small pupil is always the sure sign of safe anæsthesia. The small, contracted, or pin-point pupil is, then, the measure of anæsthesia, and is unquestionably the safest sign to trust; for during anæsthesia, and especially during prolonged anæsthesia, the respiration may become imperceptibly laboured, and its new character may escape detection, the more particularly by inexperienced administrators. But while the breathing is becoming impeded, the pupil is slowly dilating and losing its sensitiveness. This change in its character indicates that the extreme limit of anæsthesia has been exceeded. The stage of narcosis is entered upon, and it is the pupil, not the respiration, that has given the signal. When the patient's position is altered, as from the supine to the lateral, the breathing becomes obviously changed. To rely entirely on the respiration would, in this new condition, lead to a return of consciousness. Here the pulse is of use in determining the right amount of chloro-

form. Is the pulse of no further service? Undoubtedly. In prolonged operations it is the first to give signs of depression, and must be watched with care and attention, so that, when it begins to fail, those means may immediately be put into action which are best known to maintain the flagging energies of the patient. It is thus collapse is anticipated, and, if not prevented, in some degree mitigated.

THE HISTORY AND PRESENT POSITION OF SYMPHYSIOTOMY.¹

BY

C. HUBERT ROBERTS.

Of late years, in the practice of operative midwifery, an old method of treatment has been revived, viz., symphysiotomy, which seems to combine, according to reports of cases, safety both to mother and child in a large number of cases; but its position at present as a recognised treatment is far from settled.

The operation was, I believe, invented by Sigault, 1768, and performed in 1777 by Sigault and Leroy; but it soon fell into discredit, possibly owing to the absence of antiseptic knowledge, and its results were evidently disastrous. Baudelocque and many others opposed it.

We hear little up to 1891² of its performance, when the attention of obstetricians was directed to the results of Professor Morisani of Naples, who treated cases of rickety or dwarfish pelves by this method.

Dr. Spinelli went from Naples to Paris with an account of Morisani's cases, and induced Professor Pinard to allow of an experimental operation in the Hôpital Baudelocque, with a good result; and in consequence Tarnier, Pinard, and Fara-beuf expressed their intention of trying it on suitable cases.

In the *Annales de Gynécologie et d'Obstétrique*, January 1892, Spinelli gives an account of the results of this operation in the Obstetrical School at Naples, giving results of twenty-four cases, in which twenty-four mothers and twenty-three children survived.

Dr. Charpentier (*Archives de Gynécologie*, July 1892) discusses Spinelli's statistics, and states that possibly the more favourable results are due to the advent of antiseptic principles to this branch of science.

¹ Or Symphyseotomy.

² *Vide* British Medical Journal, December 12, 1891.

In Spinelli's papers he quotes his belief that—

(a.) A foetus at term and of the ordinary size can be delivered by the aid of symphysiotomy through a pelvis of 6.5 cm. = ($2\frac{3}{5}$ in.) (a Cæsarean section pelvis).

(b.) That any case of contracted pelvis can be treated by this operation, provided it be done antiseptically.

And some of his cases were very highly contracted pelvises; one a malacosteon, and some of the patients had the operation performed twice.

I mention these points as I shall refer to them later.

In February 1892 Professor Pinard¹ gave a lecture on the subject of symphysiotomy, comparing it with the use of Tarnier's basiotribe, and also with Leopold's statistics of Cæsarean section, and refers to the history of the operation, and many of the reasons of its disappearance since Sigault's time; also to the objections raised by Baudelocque, Madame Lachapelle, Bouchacourt, Stultz, and others.

He reviews Morisani's results, and raises the following points (*vide* Year-Book, Treatment, 1893):—

(a.) Can we get by symphysiotomy, without injuring the pelvis, a marked increase in its capacity, and to what degree?

(b.) May symphysiotomy be performed by the ordinary accoucheur, and how?

(c.) How do the results of the operation affect the pelvis, and what may be the sequelæ, &c.?

These points were then discussed, and experimental sections of pelvises were shown, and on the whole a favourable view seems to have been taken by the French school of the operation. At the time both the English and German schools were adverse to it.

Pinard pointed out at this time that there was not necessarily any considerable difficulty in the operation, and that special instruments were not required, though previous experience in such an operation was valuable.

The question of the dangers of the pubic separation and its subsequent results were contradictory. At the time several cases were quoted to show that serious results had occurred.

The question as to the amount of and the value of the separation was discussed (*vide* Farabeuf's Statistics), and that it required considerable separation of the bones to get an appreciable increase of volume.

Experiments were made with discs and spheres of wood.

Professor Morisani (*Ann. de Gyn.*, April 1892) publishes twelve cases, practically those discussed by Pinard, and says that only

¹ *Annales de Gynécologie*, 1892.

a certain amount of separation is safe (6 cm. = $2\frac{3}{8}$ in.), the gain being 20—22 mm. = $\frac{4}{5}$ in. C.V. He proposes the operation for high degrees of contraction, even for transversely contracted pelves or for normal pelves with a very large head. He does not appear to propose to substitute the operation for induction of labour or Cæsarean section. He states that in most of his cases the pelvis consolidated in four weeks; no bad results were stated. Some patients had it done twice.

In May 1892 (*Ann. de Gyn.*) Pinard gives three cases. All the mothers did well. Forceps were used on each occasion to terminate delivery. Pelves were about $3\frac{1}{2}$ — $3\frac{7}{8}$, and the separation about $3\frac{3}{5}$ in. Tarnier, Müllerheim, Leopold, and Porak quote single cases during the year 1892 (*Ann. de Gyn.*, Sept. 1892; *Centralbl. für Gynäk.*, &c.). So that we see during 1891–92 certainly a considerable revival of the operation had taken place, but its position as a routine method of delivery was not settled, and we only hear of it from the French and Italian schools.

Another point too, perhaps, why this is so, may be due to the dictum of the Roman Catholic Church in those countries with regard to the destruction of the unborn child, as opposed to the views held in such a country as England, where craniotomy has such good results.

During the year 1893 records of this operation show that symphysiotomy has certainly been revived, and has been discussed and used as a recognised obstetric operation, that its difficulties and dangers are not perhaps so great as was thought, that within limits a certain amount of separation of the pubic bones is safe, and that many cases have been successful with no bad results, though in some such has been the case. A few have ended fatally, or permanent harm has been done to the pelvis; and it has been recognised, as I will point out later, that it is only suitable for certain cases, and that it does not, and I fancy it never will, enter the field with such operations as induction of premature labour or Cæsarean section.

But to continue the history of cases for last year (1893).

Pinard in December 1892 or January 1893 reviews thirteen cases of the previous year (q.v.), in which all the mothers and ten children were alive.

The fatal result to the three children he accounts for by—

- (a.) Fractured parietal bone.
- (b.) Congenital feebleness.
- (c.) Fractured frontal bone.

And he lays stress on the following points (Year Book, 1894) in symphysiotomy:—

(a.) Before attempts are made to deliver, there must be no obstruction endangering the child.

(b.) A vertex presentation is preferable.

(c.) Forceps are used to deliver after section of the bones.

(d.) Do not delay the delivery of the placenta.

In the British Medical Journal, April 1893, Smyly reports the first case in the United Kingdom at the Rotunda Hospital, Dublin. It was about a 3 in. pelvis; the operation appeared fairly easy; the bones sprang apart, tearing the urethra and soft parts; the child was expressed; forceps were not used; the child was asphyxiated, but recovered. Subsequently the mother had incontinence of urine and bed-sores, but recovered eventually after some time.

Harris' tables give this as the fifty-fifth case up to the end of 1893; four maternal and five fetal deaths. Abroad we get further accounts of cases from Varnier, Morisani, Leopold, Pinard, Tellier, Maygrier, and others. Some of the cases, as far as I can make out, were fatal, and serious injury done during delivery. In Tellier's fatal case serious bleeding took place; urethra, vulva, and perineum were torn. The operation lasted an hour, and the patient died shortly after. The sacro-iliac ligaments were found stretched and torn.

In Maygrier's case the vagina was torn; patient died on the twenty-first day, of pulmonary embolism; no sign of repair was found of the pubic bones.

Pinard had done nineteen cases from February 1892 up to April 1893. All mothers lived, three children died.

In the *Lancet*, August 5, 1893, Dr. Lewers reports an interesting case at the London Hospital:—

The patient, æt. 20, admitted February 12, 1893; forceps failed to deliver. C.V. = probably $2\frac{3}{4}$ in. Dist. sp. ill. = $8\frac{1}{4}$. Dist. cr. il. = $10\frac{3}{4}$. Ext. conj. = 6 in.

Great difficulty was experienced in dividing the symphysis, an Adams saw being called into requisition. After a separation of two inches the child was delivered by forceps. The operation lasted two hours. A good deal of laceration of soft parts took place, the rent extending into the vulva. The patient had incontinence of urine for three weeks. The wound did not heal well; there was suppuration and cellulitis. Some dead bone came away later. She was in the Hospital from February 12th to July 15th. The child, at first in a state of suspended animation, subsequently recovered.

Dr. Lewers, in his remarks on the case, points out the

difficulty in dividing the symphysis, and the easy delivery afterwards with forceps. He thinks that the indication is not so much the particular degree of contraction, which must not be a high one, as the failure to effect delivery with forceps. Also he insists on the careful attention to antiseptics; also that possibly this operation is only for experts, and not one for ordinary general practice or in emergency, and that possibly simpler methods of delivery in such cases would be less dangerous, and which we were accustomed to.

Another case bearing upon this subject is reported by Dr. J. H. Glynn (*Lancet*, July 1893) of spontaneous rupture of the symphysis during labour, followed by suppuration and death, even where no instruments or section of the symphysis were performed.

In the *British Medical Journal*, May 6, 1893, appears a letter from Dr. Murdoch Cameron, in which he remarks on symphysiotomy, saying that its limits are small, and that it can never replace Cæsarean section or induction of labour.

Another curious case is reported in the *British Medical Journal*, June 24, 1893, by Surgeon-Major Dummock of Bombay, where he performed symphysiotomy on a dwarfed, rickety Hindu woman, with a very badly contracted pelvis, where the brim only admitted a finger. The child was dead, and the mother too exhausted at the time for Cæsarean section. Perforation and cranioclastm were done in addition to symphysiotomy. Great separation only gave C.V. = $2\frac{1}{2}$. She suffered from great shock. The recovery was very slow; she had severe pain in pelvis and thigh, and swelling over right sacro-iliac joint and gluteal region. She eventually recovered. He reports another case of a rickety Justo-minor pelvis C.V. = $2\frac{1}{2}$, which was not satisfactory, the perineum and fourchette being badly torn during the subsequent forceps extraction.

In the *Lancet*, February 18, 1893, is a list of Pinard's thirteen cases at the Clinique Baudelocque in 1892, which I venture to give here, as it is the most complete account of a series of cases that I can find.

CASE I. Feb. 4, 1892 (Pinard).—B——, aged 32. She has had two confinements. The pelvis was canaliculate; the promonto-subpubic diameter 9.7 cm. The first confinement took place on July 13, 1886, at term. The presentation was of the shoulder; there was prolapse of the cord; the fetus was dead and macerated. Embryotomy was performed. The head could only be extracted after basiotripsy. The patient went out thirty-two days afterwards. The second confinement took place on Feb. 3, 1892.

The last monthly period was from May 1 to 6, 1891. The fundus uteri was 36 cm. above the upper border of the symphysis pubis. There was hydramnios; the foetus was mobile, with a tendency to present by the breech—it appeared to be large. Mensurative palpation showed a considerable disproportion. Champetier's bag (*ballon Champetier*) was introduced at 7.30 P.M. On Feb. 3 at 12.15 (midnight) dilatation was complete and expulsion of the bag imminent. At 12.30 A.M. chloroform was given and the bag extracted, the pouch of membranes being found intact. Many unsuccessful attempts were made to bring down the head by external manipulation, the foetus presenting by the breech in the right transverse diameter. M. Pinard then decided to extract by the feet after a preliminary symphysiotomy. At 12.50 A.M. the incision was begun, spontaneous separation after symphysiotomy of 1 cm. being effected, followed at 1.15 A.M. by artificial rupture of membranes and beginning of extraction. At 1.20 A.M. the breech was outside the vulva. At 1.24 the head was extracted by Champetier's method, the extraction being difficult, accompanied by two jerks, the latter of which was the more noticeable. The separation was not measured. Delivery was effected. At 1.45 A.M. the parts were sutured and the dressings fixed by a plaster bandage. The child weighed 3350 grm. (over 7 lbs.) and measured 52 cm. It was apparently dead, but was quickly resuscitated by simple friction. There was deep depression of the right parietal bone posteriorly, so that while the biparietal measurement was 9.8 cm., the diameter, which went from the bottom of the depression to the protuberance on the anterior portion of the parietal bone, measured only 8.9 cm. The child died on Feb. 6 (third day), having presented the classical symptoms of meningeal hæmorrhage. (The head is preserved in the museum.) The puerperal condition was normal; only once on the fifth day did the temperature reach 100.6° F. (38.2° C.). There was union by first intention. The patient rose on the twenty-first day and was able to walk without pain. There was no abnormal mobility. She was seen on Dec. 7, when there was found to be no trouble in walking or micturition.

CASE 2. Feb. 22, 1892 (Pinard).—G——, primipara. The pelvis was flattened; the promontory accessible. The confinement took place at term. She was admitted at 9.15 P.M. on Feb. 24, the os being the size of a franc-piece; the membranes were intact and tense. The fundus uteri rose to 47 cm. above the upper border of the symphysis pubis. The ovum was large; there was presentation of the vertex in the left transverse diameter; not engaged. The foetus was living. There was artificial rupture of the membranes at 10.15 P.M. on Feb. 24; 400 c.c. of liquid escaped. Complete dilatation took place at 4.30 A.M. On the 25th the head was found to be fixed, but not engaged. At 7.30 A.M., the head not being yet engaged in spite of very good contractions, M. Lepage made a first application of the forceps under chloroform. Traction was made during fifteen minutes without result. At 8.4 A.M. a second application of the forceps was made; the tractions lasted three minutes only; no progress. M. Pinard arrived at 9.30 A.M. Chloroform having been given, symphysiotomy (nineteen minutes) was performed, giving immediately after the section and spontaneously a separation of 1 cm., which the abduction of the thighs increased without difficulty to 3 cm. There was a third application of the forceps, when extraction was extremely easy in four minutes of a boy (living) weighing 4630 grm. (over 10 lbs.), measuring 53½ cm. (20½ in.), of which the cephalic diameters were: Occipito-mental, 14.3 cm.; occipito-frontal, 12.7 cm.; sub-occipito-bregmatic, 10 cm.; sub-

occipito-frontal, 11.3 cm.; biparietal, 9.3 cm.; bitemporal, 8.7 cm. During the engagement and descent of the head the separation of the pubes reached 6.1 cm. The child weighed on March 15, 5970 grm. (over 13 lb.). The puerperal condition was normal; only four times—viz., on the third, fifth, tenth, and fourteenth days—did the temperature reach 38° C. (100.2° F.). There was union by first intention. The patient rose on the thirty-third day and was able to walk without pain; there was no abnormal mobility. She was seen on Dec. 7, when there was no trouble in walking or micturition. The child is living and healthy, and at present with a nurse.

CASE 3. March 23, 1892 (Pinard).—P——, aged 30. She has had four confinements. The pelvis was annular; the promonto-subpubic diameter 9 cm. Her first confinement took place in 1887, at term. There was intervention after administration of ether; child still-born. The second confinement took place in 1888, induced at eight months. The child died on the third day. The third confinement occurred in 1890, at term. There was an application of the forceps by M. Fochier, who extracted a boy weighing 3220 grm. (about 7 lb.), but having a biparietal diameter of only 7 cm. The child died after fifteen days. There was a fourth confinement on March 23, 1892 (Clinique Baudelocque). The last monthly period occurred June 30 to July 2, 1891. The fundus uteri rose to 36 cm. above the upper border of the symphysis. There was presentation of the vertex in the left transverse diameter (after external version and application of band). Tarnier's bag was introduced on March 21 at 10.50 A.M.; the expulsion took place at 1 P.M. On the 23rd at 5 A.M. Champetier's bag was introduced. At 11 A.M. dilatation was complete, when the bag was extracted under chloroform and the membranes ruptured. After an hour (12.15) M. Fochier made successively two oblique applications of Tarnier's forceps; then M. Pinard made a direct application—all without success. At 12.40 symphysiotomy was performed (seven minutes). The pubes separated spontaneously 1 cm.; by abduction of the thighs the separation was brought to 4.8 cm. At 12.50 a fourth application of the forceps was made, during which the separation amounted to 6½ cm. At 1 P.M. extraction was effected of a boy weighing 2730 grm. (over 5 lb.), whose cephalic diameters measured immediately after birth: Occipito-mental, 12.7 cm.; occipito-frontal, 11.8 cm.; sub-occipito-bregmatic, 10.4 cm.; sub-occipito-frontal, 10.6 cm.; biparietal, 9.7 cm.; bitemporal, 7.9 cm.; sub-mento-bregmatic, 9.5 cm. The child was born in a state of apparent death, but rapidly revived. The child weighed on April 15, 3000 grm. (6.6 lb.). The puerperal condition was normal. There was union by first intention. The patient rose on the twenty-ninth day, and was able to walk without pain; there was no abnormal mobility. She was seen on Dec. 7, and had then no trouble in walking or micturition. The child is living and healthy.

These three women were presented to the Academy of Medicine at its meeting on May 21, and I read the *résumé* of the cases at the meeting of the Obstetrical Society of France.

CASE 4. May 3, 1892 (Varnier).—R——, aged 26; four confinements; height 1.46 m. (4 ft. 9½ in.). Pelvis rachitic, annular; promonto-subpubic diameter, 9.8 cm. First confinement in 1886, terminated by embryotomy after two days' labour. Second confinement in 1887, induced at about eight months; terminated by version when dilatation complete (head, with prolapse of cord, hands and one foot); girl, born in a state of apparent death; revived without insufflation; weight 2400 grm.

(under 5 lb.); died next day. Third confinement in 1890, induced at eight months; terminated by basiotripsy. Fourth confinement on May 3, 1892 (Clinique Baudelocque); last monthly period August 3 to 5, 1891. The fundus uteri rose to 29 cm. above the upper border of the symphysis; presentation of the vertex in left transverse diameter. Considering the antecedents, M. Pinard decided to induce labour and to practise symphysiotomy before making any attempts at extraction. Champetier's bag was introduced on May 3 at 5.40 A.M.; at 10.30 A.M. dilatation was complete; membranes intact; no prolapse; head in left transverse diameter, not engaged. At 11.48 A.M. symphysiotomy was performed by M. Varnier. Spontaneous separation of 3 cm. occurred, followed by artificial rupture of membranes. At 11.58 A.M., on the application of forceps in the left transverse diameter, the extraction was easy (during which the separation did not increase more than half a finger's breadth) of a boy weighing 2130 gm. (about $4\frac{1}{2}$ lb.), whose cephalic diameters were: Occipito-mental, 15.4 cm.; occipito-frontal, 11.1 cm.; sub-occipito-bregmatic, 9.3 cm.; sub-occipito-frontal, 9.8 cm.; biparietal, 8.2 cm.; bitemporal, 7.5 cm. The child was born in a state of apparent death, but revived in two minutes without insufflation. He appeared feeble. He was placed in an incubator at 36° C. (96.8° F.). Breathing oppressed all day. On May 3 there was cyanosis. He did not suck, but took and kept down milk which was given with a spoon. On May 4 he was in the same condition; the respiration was accelerated, the cyanosis persisted, and milk was rejected. He died on the 5th at 6 A.M. At the necropsy at 6 P.M. the weight was 1950 gm. (over 4 lb.); all the viscera appeared healthy; no fracture or fissure; Wormian bones. Puerperal condition pathological; abscess of left labium majus incised and drained on the seventeenth day, without any connection with the operation wound, which united by first intention. The patient rose on the twenty-sixth day and walked without pain. She went out on June 23 in perfect condition. When seen on Dec. 7, no trouble in walking or micturition was observed.

CASE 5. May 29, 1892 (Pinard).—A—, aged 38; six confinements. Pelvis annular; promonto-subpubic diameter 9.3 cm. First confinement in 1885 at term, terminated by basiotripsy of the living foetus after seventy-three hours of labour and an application of forceps made by M. Pinard. Weight of foetus 3520 gm. (nearly 8 lb.). Second confinement in 1887, induced at seven months and a half. The child died during labour. The third confinement occurred in 1888, was induced at seven months, and was terminated by an application of forceps at the entrance to the pelvis. The boy, weighing 2200 gm. (nearly 5 lb.), died during the night. Biparietal diameter 8.6 cm. The fourth and fifth pregnancies were miscarriages at two months and a half and three months respectively. The fourth confinement took place on May 29, 1892, at the Clinique Baudelocque. Last monthly period occurred from September 14 to 17, 1891. Presentation of vertex, not engaged in left transverse position. Considering the history, M. Pinard decided to wait till term, and practise symphysiotomy before making any attempts at extraction. Onset of labour was induced on May 28 at 5 A.M. by premature rupture of the membranes; dilatation was complete on the 29th at 6 A.M. At 10.10 A.M. symphysiotomy was performed by M. Pinard (ten minutes); spontaneous separation of 2.5 cm. At 10.38 A.M. the forceps were applied in the left transverse diameter, extraction being easy at 10.40 (during which the separation extended to 4.5 cm.) of a boy weighing 3110 gm. (over 6 lb.), crying at once, and with the following cephalic diameters: Occipito-mental, 13.2 cm.; occipito-frontal, 11.5 cm.;

sub-occipito-bregmatic, 10 cm.; sub-occipito-frontal, 10 cm.; biparietal, 9.1 cm.; bitemporal, 8.2 cm. The infant was suckled by the mother, assisted at first by a wet-nurse; he weighed when leaving the clinique, on the thirty-first day, 3850 grm. (over 8 lb.). Puerperal condition normal; only twice—the second and seventh day—did the temperature rise to 38° C. (100.6° F.). Union by first intention. The patient rose without permission on the sixteenth day, but experienced no bad result. She went out on the thirty-first day in perfect condition. When seen on December 7 she appeared to have no trouble in walking or micturition. Child healthy.

CASE 6. June 29, 1892 (Pinard).—F—, aged 32; primipara; height 1.35 m. (4 ft. 5 in.). Pelvis generally contracted; promonto-subpubic diameter, 9 cm. Last monthly period occurred from October 9 to 12, 1891. Presentation of vertex in left transverse position. On June 28, considering the information furnished by palpation, by measurement of the promonto-subpubic diameter, and by the exploration of the entire pelvis, M. Pinard decided to induce labour and to practise symphysiotomy before attempting to extract. Tarnier's bag was introduced at 10.39 A.M. on the 28th, and Champetier's bag at 5.30 A.M. on the 29th. The membranes were ruptured; dilatation complete at 9 P.M. Extraction of the bag caused a tear of the left side of the vestibule, necessitating the application of two pressure forceps. At 9.15 P.M. symphysiotomy was performed by M. Pinard (three minutes); separation 3.5 cm. At 9.24 P.M., on the application of forceps in the left transverse diameter, easy extraction was effected at 9.42 P.M. (during which the separation amounted to 6.2 cm.) of a boy weighing 2720 grm. (over 5 lb.), crying at once, and with the following cephalic diameters: Occipito-mental, 13 cm.; occipito-frontal, 11 cm.; sub-occipito-bregmatic, 10 cm.; sub-occipito-frontal, 10.3 cm.; biparietal, 9.4 cm.; bitemporal 8.2 cm. Brought up by a wet-nurse, this child weighed when it left on the fifteenth day 4000 grm. (8.8 lb.). Puerperal condition normal. Union by first intention. The patient rose on the twentieth day, and was able to walk without pain or difficulty. She is at present a nurse in the hospital. The child, when seen on December 7, was healthy.

CASE 7. July 7, 1892 (Pinard).—A—, aged 23, primipara; height, 1.42 metres (4 ft. 8 in.); pelvis annular; promonto-subpubic diameter, 10.4 cm.; last monthly period from September 25 to 30, 1891; vertex presenting in left transverse position. On July 6, considering the information furnished by palpation, M. Pinard induced labour with the aid of Tarnier's bag, which was replaced on the 7th at 4 A.M. by one of Champetier's bags. Dilatation was complete at 10.15 A.M. At 10.40 A.M., after manual exploration, symphysiotomy was performed by M. Pinard (seven minutes), with spontaneous separation of 1 cm. At 10.51 A.M. artificial rupture of membranes and application of forceps in left transverse position were followed by the extraction at 11.4 A.M. (during which the separation reached 5 cm.)—thanks to a second application of the forceps, the former threatening to slip—of a living boy weighing 3300 grm. (over 7 lb.), with the following cephalic diameters: Occipito-mental, 13 cm.; occipito-frontal, 12.2 cm.; sub-occipito-bregmatic, 11 cm.; sub-occipito-frontal, 12 cm.; biparietal, 10 cm.; bitemporal, 9 cm. Brought up by a wet-nurse, this child weighed when it left on September 2, 4340 grm. (about 9½ lb.). Puerperal condition slightly pathological, the temperature oscillating about 38.5° C. (101.4° F.) during the first seven days. Union by first intention. The patient rose on the twenty-fourth day and could walk

without pain. When seen on December 7 she had no trouble in walking or on micturition. Child healthy.

CASE 8. July 30, 1892 (Lepage).—M——, aged 26; two confinements; pelvis annular; promonto-subpubic diameter, 9.7 cm. First confinement in 1887, at term, spontaneous, of a large child, now living and healthy. Second confinement at the Clinique Baudelocque on July 30, 1892. Last monthly period from October 1 to 5, 1891. Vertex presentation in left transverse position; head not engaged. When admitted on July 30, at 4.44 A.M., dilatation was nearly complete. Labour began on the 29th at 11 P.M.; membranes intact. At 6.45 P.M. artificial rupture of membranes. At 7 A.M. M. Lepage reports: "Dilatation complete; head very high in left transverse position; fluid green; prolapse of the cord; heart sounds dull and irregular." After an effectual application of the forceps (traction during twenty minutes), M. Pinard having been communicated with, M. Lepage performed symphysiotomy at 10 A.M. (thirteen minutes); the section of the symphysis was from below upwards, being followed by spontaneous separation of 26 mm. On the application of the forceps an easy extraction was effected at 10.18 A.M. (during which the separation reached 5 cm.) of a boy weighing 4000 grm. (8.8 lb.). He was born apparently dead, was insufflated and revived ten minutes afterwards, having the following cephalic diameters: Occipito-mental, 13.1 cm.; occipito-frontal, 11.5 cm.; sub-occipito-bregmatic, 9.8 cm.; sub-occipito-frontal, 11.3 cm.; biparietal, 9.5 cm.; bitemporal, 8.7 cm. Brought up by a wet-nurse, the child weighed when he left on September 2, 4090 grm. (nearly 9 lb.). Puerperal condition pathological; abscess of the right labium majus incised and drained on the tenth day without any connection with the operation wound, which united by first intention. The patient rose on the thirtieth day. Was discharged on November 5 in perfect condition. When seen on December 7 no trouble in walking or micturition was noticed. Child healthy.

CASE 9. September 13, 1892 (Varnier).—B——. Two confinements. Height 1.39 metres (4 ft. 6½ in.); pelvis rachitic, annular; promonto-subpubic diameter, 9.2 cm. First confinement in 1889 at term terminated by basiotripsy of a dead fetus. The patient was brought in on a stretcher, with dilatation complete; membranes ruptured; prolapse of cord and of anterior arm; head not engaged in left transverse diameter. M. Varnier had to compress the head twice. The extraction only became possible after putting back the anterior arm, and it was necessary to practise Ribemont's method to extract the trunk. Weight of the child 3350 grm. (over 7 lb.). Second confinement September 13, 1892, at the Clinique Baudelocque. Last monthly period December 10 to 15, 1891. The patient entered the hospital on July 26 pregnant about seven months; fetus living; no fixed presentation; the head was retained below by the aid of the "entocique" binder from August 15. At this time the palpation showed that there was a disproportion. M. Pinard left for his holiday and gave M. Varnier (his assistant) the responsibility of fixing the date for symphysiotomy. M. Varnier decided to wait till term. Labour began on September 12 at 7 P.M.; dilatation was complete at 5.40 P.M.; symphysiotomy was performed by M. Varnier (six minutes); separation to 3.5 cm. was induced by abduction of the thighs; spontaneous rupture of membranes; at 5.49 P.M. the application of forceps in the left transverse diameter was followed by extraction at 5.55 (during which the separation reached 7 cm.) of a boy weighing 3200 grm. (7 lb.), who cried at once and had the following cephalic diameters: Occipito-mental, 12.5 cm.; sub-

occipito-bregmatic, 9.8 cm.; sub-occipital-frontal, 11.4 cm.; biparietal, 9.5 cm.; bitemporal, 8.5 cm.; circumference, sub-occipito-bregmatic, 34.0 cm.; circumference, sub-occipito-frontal, 36 cm. Brought up by a wet-nurse, this child weighed when discharged on October 16, 3630 grm. (over 8 lb.). Puerperal condition: Three times only, on the third, fourth, and fifth days, did the temperature reach 38.5° C. (101.3° F.). There was union by first intention. The patient rose on the nineteenth day and was able to walk alone and without pain. It is to be noted that during the extraction there was produced (to the left of the urethra, which was intact, as catheterism proved) a longitudinal tear in the anterior wall of the vagina, which allowed the index-finger to pass from the vagina to between the separated pubes. The operation wound communicated with the vagina, which was tamponed with iodoform gauze left in position for three days. The patient left on October 16 in perfect condition. There was no abnormal mobility, or trouble in walking or micturating; the vaginal cicatrix could be clearly felt by the finger, and was not painful; when seen on December 7 the same condition was observed. The child was healthy.

CASE 10. October 1, 1892 (Pinard).—F——, aged 25. The following are the notes: Two confinements; pelvis flat; promonto-subpubic diameter, 10 cm. First confinement in 1891; albuminuria and eclampsia; twins; extraction by the feet, the children being alive; one died on the fourteenth day and the other at four months; one weighed 2300 grm. (5 lb.), biparietal 8.5 cm.; the other 1980 grm. (over 4 lb.), biparietal 8.4 cm. Second confinement October 1, 1892 (Clinique Baudeloque); last monthly period December 15 to 18, 1891; presentation of the vertex, not engaged, in left transverse position; labour began on September 29 at 7 P.M.; at 9 P.M. on October 1, dilatation having remained stationary for twelve hours (as the size of a five-franc piece), the membranes were ruptured; the head scarcely engaged, very much inclined on the posterior parietal region midway between flexion and extension. M. Varnier applied a Champetier's bag, and when the dilatation was complete, after extraction of the bag distended to the maximum, he applied the forceps in the left transverse diameter, which only accentuated the deflexion; he then made a second application of the forceps; flexion was obtained, but in spite of powerful traction no engagement was produced; not wishing to make a forcible application, M. Varnier consulted M. Pinard, who at 10.50 P.M., things being still in the same condition, performed symphysiotomy (twelve minutes), followed by immediate separation to 3 cm.; at 11.9 P.M., on the application of the forceps in the left transverse diameter, easy extraction was effected (during which separation amounted to 4.5 cm.) of a boy weighing 3220 grm. (nearly 8 lb.), with the following cephalic diameters: Sub-occipito-bregmatic, 9.3 cm.; sub-occipito-frontal, 10.6 cm.; biparietal, 9 cm.; bitemporal, 7.8 cm.; circumference—sub-occipito-bregmatic, 31.31 cm.; sub-occipito-frontal, 32 cm. Brought up by a wet-nurse, the child weighed when he left 3420 grm. (nearly 7 lb.). Puerperal condition normal; union by first intention. The patient rose on the nineteenth day, walking alone and very well. She left on November 6 in perfect condition; when seen on December 7 she had no trouble in walking or on micturition. Child healthy.

CASE 11. October 6, 1892 (Pinard).—B——, aged 28. The following are the notes: Two confinements; pelvis rachitic, annular; promonto-subpubic diameter, 10 cm. First confinement in 1889, at term, terminated by an application of the forceps; the child died on the twenty-

seventh day of convulsions, bearing still the traces of the forceps. Second confinement on October 6, 1892 (Clinique Baudelocque); last monthly period, December 26 to 29, 1891; presentation of the vertex, not engaged, in left transverse position; labour began on October 5 at 3 A.M.; spontaneous rupture of membranes at 7.20 P.M.; dilatation complete at 11.55 P.M.; the forceps were applied in left transverse diameter at the pelvic entrance by Dr. Wallich, who, in spite of energetic traction, could not engage the head; after making a manual examination, M. Varnier, not wishing to make a second application, which would involve force, consulted M. Pinard, who, being exactly informed as to the condition of the mother and foetus, advised delay; at 10 A.M., the temperature being 38.8° C. (102° F.), and things being still at the same point, M. Pinard performed symphysiotomy (two minutes) resulting in immediate separating to 3 cm.; on the application of the forceps in the left transverse diameter extraction was easily made at 10.25 A.M. (during which the separation reached 5.8 cm.) of a boy weighing 3750 grm. (over 8 lb.). The infant was born apparently dead, but rapidly revived, and had the following cephalic diameters: Occipito-mental, 13.6 cm.; occipito-frontal, 11.0 cm.; sub-occipito-bregmatic, 10.3 cm.; sub-occipito-frontal, 11.5 cm.; biparietal, 8.4 cm.; bitemporal, 7.9 cm. Brought up by a wet-nurse. this child weighed when he left, on November 15, 4840 grm. (about 9½ lb.). Puerperal condition: temperature oscillated about 38° C. (100.4° F.) without exceeding 38.5° C. (101.3° F.), during the first twelve days; union by first intention; the patient rose on the twenty-third day (October 29), and left on November 15 in perfect condition; when seen on December 7, she had no trouble in walking or on micturition. Child healthy.

CASE 12. October 21, 1892 (Wallich).—M——. The following notes were taken: Three confinements; pelvis annular; promonto-subpubic diameter 10.5 cm. First confinement spontaneous, at term; child living. Second confinement spontaneous, in 1889; child large, died during labour. Third confinement on October 21, 1892 (Clinique Baudelocque); last monthly period January 4 to 8; presentation of vertex, not engaged, in left transverse diameter; labour began on October 19, at 8 P.M.; spontaneous rupture of membranes at 1 A.M. on the 20th; at his morning visit on October 20 M. Varnier reported that the head, which presented in left transverse diameter, not engaged, in an attitude midway between flexion and extension, was inclined on the anterior parietal region (obliquity of Naegele); foetus large; dilatation equal to a five-franc piece; prognosis impossible, considering the obliquity of Naegele, the deflexion, the retraction of the pelvis, and the size of the foetus. If these things did not correct themselves, it would be useless and dangerous to apply the forceps. Symphysiotomy would have to be performed at once if the head did not become engaged of itself. At 5 P.M. dilatation was complete; at 10 P.M. manual exploration showed that the head had not moved a line; at 11.50 P.M. M. Wallich performed symphysiotomy, which resulted in immediate separation (at 12.10) by abduction of the thighs to 2.5 cm.; a first application of the forceps having slipped (12.15), and there being a prolapse of the cord, M. Varnier made a second application rapidly in flexion; he succeeded in extracting at 12.20 (during which the separation reached 4.5 cm.) a boy weighing 3650 grm. (8 lb.), who was born apparently dead, but began to breathe at 12.27, and to cry at 12.31. The cephalic diameters were: Occipito-mental, 13.5 cm.; occipito-frontal, 12.3 cm.; sub-occipito-bregmatic, 10.4 cm.; sub-occipito-frontal, 11.4 cm.; biparietal, 9.5 cm.; bitemporal, 7.9 cm.; circumference—sub-occipito-bregmatic, 33.0 cm.; sub-occipito-

frontal, 35.0 cm. This child, nourished by a wet-nurse, weighs now 4610 grm. (over 10 lb.). Puerperal condition: temperature 38.6° C. (101.3° F.) during the fifth, sixth, and seventh days; union by first intention; stitches removed on October 29; the patient rose on November 8 (the nineteenth day); she walked well and without pain till November 16, on which day the temperature was 38.4° C. (101.2° F.); on the next day she had phlegmasia alba dolens of the left leg, for which she is still being treated.

CASE 13. Nov. 13, 1892 (Potocki).—F—, aged 38. The notes were as follows: Two confinements; pelvis rachitic, annular; promonto-subpubic diameter, 9.7 cm. First confinement in 1880, at term; cephalotripsy. Second confinement on November 13, 1892 (Clinique Baudelocque); last monthly period from February 18 to 22, 1892; breech presentation transformed by external version into occipito-iliac right transverse; labour began on November 11 at 11 P.M.; spontaneous rupture of membranes occurred at midnight; dilatation was complete on November 13 at 8 A.M.; considering the information furnished by palpation, M. Potocki performed symphysiotomy at once (nine minutes), which was followed by spontaneous separation to 3 cm.; at 9.11 A.M. the application of the forceps resulted in the extraction at 9.23 (during which the separation amounted to 5.7 cm.) of a girl weighing 3300 grm. (over 7 lb.); born apparently dead, the infant was insufflated and revived, but died at 1 A.M. on November 14. The cephalic diameters were as follows: Occipito-mental, 13.6 cm.; occipito-frontal, 11.2 cm.; sub-occipito-frontal, 10.7 cm.; biparietal, 9.5 cm.; bi-temporal, 8.4 cm.; the application of the forceps was irregular, oblique, the anterior frontal region presenting a deep depression produced by the anterior blade; this depression disappeared in the evening at the same time as convulsive movements of the left half of the face appeared; the head, which is preserved in the museum, will be described later. Puerperal condition: temperature oscillating, about 38° C. (100.4° F.) the first five days; union by first intention; the patient rose on the twenty-second day; she had no trouble in walking or on micturition; is still under observation.

You have just seen these thirteen women, and you are able to report that their general condition leaves nothing to be desired. The only evidence of the operation that they have undergone is a small cicatrix, scarcely visible, in the middle of the pubic region. In each the pelvis is as firm as before the operation. There is no trouble in micturating or in standing. The result is therefore as satisfactory and as complete as possible on the maternal side. We have been less happy in the case of the infants, for although all were extracted living, I have only been able to show you ten, all indeed equally well, but the other three died—the first on the third day after birth (Case 1), the second on the second day after birth (Case 4), and the third in sixteen hours after birth (Case 13). If we look for the cause of death in each case, we see that in the first death was produced by fracture of a parietal bone at the moment of extracting the after-coming head. The preliminary separation of the pelvis was certainly not sufficient, considering the size of the head and the amount of pelvic contraction. This is an extremely important point, to which I will return. The second child died of congenital feebleness, for it showed no lesion at the necropsy. Although its weight at birth was 2130 grm. (about 4½ lb.), its vitality was rudimentary. Its cry was feeble and its abdomen was large. Respiratory troubles soon appeared, and it died of cyanosis. Neither the operation nor the operator can be blamed. The only one who might be considered

culpable is myself, for I might be reproached for interrupting pregnancy too soon. But I was led to act thus because of what happened at previous confinements—first, at term, embryotomy; second, induced at eight months, foetus dead; third also at eight months, basiotripsy. I shall have to return to this point. As to the third child, it succumbed, like the first, to a fracture, this time of the frontal bone. Although the spontaneous separation of the pubes before extraction was 3 cm., the head engaged with difficulty, for it was large (biparietal diameter 9.3 cm.), but especially because the application of the forceps was irregular (oblique). This is a point which we must not forget presently. Such are the results furnished by symphysiotomy in this clinique since February 4, 1892.

Let us now consider the following three questions:—1. What has our experience taught us? 2. What place ought symphysiotomy to occupy amongst obstetrical operations? 3. What are and what will be its relation to other operations?

Pinard, after detailing these cases, considers that the operation is not a very difficult one, and gives a minute account of the technique of his operations, and adds that the bones must be separated at least 4 cm., but not beyond 7 cm., before delivery with forceps is attempted, and that there should be no obstruction to the child then; forceps were used in all cases. He sutures the soft parts with silver, but not the bones, which are kept in contact with bandages or plaster of Paris. He further states that he believes symphysiotomy to hold a foremost place among obstetric operations, and refers with satisfaction to the support given lately to the operation by Tarnier and Leopold. Apparently the conservative nature of the operation as regards the child is the strong point of foreign operators.

He advises it in a large number of cases, particularly cases where forceps at the time fail to deliver. In obliquely contracted, asymmetrical, or synostosed pelves it evidently is not the operation to perform.

Another case this year, 1894, was done at the Guy's Hospital by *Dr. Galabin*. He kindly wrote to me on the subject, but, as the case has not been published yet, I am only at liberty to say that it was quite successful, but that the contraction was rather extreme for this operation, as the bones diverged nearly 5 cm. before the child could be pulled through by forceps.

The last case in London was operated on at Queen Charlotte's by *Dr. Griffith* this month (Oct. 1894), but as the patient is still in the hospital, her condition being quite satisfactory, it would be useless till *Dr. Griffith* publishes the result to give further details. *Dr. Griffith* kindly tells me that he is satisfied that really suitable cases are few and far between, even in such a big maternity experience as St. Bartholomew's and Queen Charlotte's.

The operation, he tells me, was not easy, and took a considerable time (two hours nearly), hæmorrhage after division of the bones was severe, but was stopped by plugging with gauze; and there was difficulty in delivery, even after this operation, by forceps. Up to this date (Oct. 30) the case has done admirably. Great care was taken by means of an assistant on each side of the pelvis, that no undue separation took place after division of the bones. The after-treatment was simple, and beyond the legs of the patient being tied together, no special pelvic girdle or bandage was used.

At the *Obstetrical Society (London)*, March 1894, a contribution was read from Dr. Harris of Philadelphia—"A Plea for Symphysiotomy"—giving the early history and its bad result, from 1777-1858. He relates that in this period 150 cases were operated on; in 114 recorded, 74 women and 41 children lived, or mortality, 35 per cent. mothers and 64 per cent. children. Under Morisani and Nori, in 1866, mortality has reduced mothers 20 per cent., children 18 per cent. In 1886 better results were obtained by them: out of 50 mothers, 48 were saved and 44 children. In 1892, Harris reports only nine fatal cases out of 83. In the United States, Harris gives one maternal death out of the last 15 cases (twelve different operators. Professor Pinard did not have a death till his twentieth case.

Harris then states that to save the foetus the woman should be operated upon in good season, the size of the pelvis should be carefully ascertained, the child should be very carefully and not hurriedly delivered by forceps, and asphyxia be guarded against.

The first case in America was done in 1892—primipara at 23, 5 ft. 7 in.; "contracted pelvis and large foetus; child = 11 $\frac{3}{4}$ lbs. No injury was reported; both did well. This was the first of 31 operations in the United States. Of the four maternal deaths out of the 31, one died of exhaustion in twelve hours; another of septic peritonitis in twelve days; another of pneumonia, "after exposure and whisky," twenty hours in labour; and the last from sepsis, originating in the subosseous wound (three days in labour), death occurring on eleventh day.

The nine foetal deaths out of 31 he attributes to prolonged labour, meningeal hæmorrhage, injury prior to admission, asphyxia, induction prior to the operation, and injuries by delivery by the feet.

Harris in his letter "wonders that we in England do not resort more often to this operation with such records."

Then followed remarks by various Fellows of the Society.

Dr. Lewers showed his case (q.v.). The mother seemed well, but she "could not scrub," though walking gave her no trouble. He remarked on the difference between cases in labour and post-mortem results of experimental division of the symphysis; also, that the good results of late may be put down to antiseptics, and that the operation is but for slight degrees of contraction, and that it is only for cases in an advanced stage of labour at a time when turning would not be available.

Dr. Horrocks thought that we should know more of its ultimate results, and he prefers Cæsarean section or version to symphysiotomy.

Dr. Griffith thought that the operation will never become popular in England, since it is not the best operation under the circumstances. He pointed out that in Paris apparently forceps-induction and version were given up for this operation, and that really suitable cases are few, and that in cases we can watch it can never replace Cæsarean section or induction.

Dr. Leith Napier pointed out its unsuitability for high contraction, and the probable superiority of version in slighter cases; and that, as far as he knew, out of 4000 cases of midwifery a year, not a single case seemed to justify symphysiotomy.

Dr. Herman thought that the operation had not yet taken a place as a method which ought to be received as a part of our ordinary means of effecting delivery in difficult cases.

Harris' and Pinard's mortality is about 10 per cent.; therefore, in point of mortality to mothers, it has no advantage. The question of the pelvic consolidation later, especially for laborious work, is a great consideration. There is, too, the question of repetition of the operation and injury during operation; and that Cæsarean section offers the best prospect of success and survival, where the patient wishes for a living child, which cannot be born without some operation of the kind.

At the *International Medical Congress, Rome, 1894*, some discussion took place upon the subject of symphysiotomy. Professor Morisani, of Naples, thinks the operation justified by theoretical reasons, as well as clinical experience; of course, in all cases the child being alive, otherwise the operation is not considered.

He gives as indications for the operation—

- (a.) Delivery at term in question.
- (b.) Labour well advanced.
- (c.) Os uteri dilated fully.

He does not think that symphysiotomy should be associated

with premature delivery, as there is extra risk to the foetus. He employs a blunt-pointed knife to divide the symphysis, or even a chain-saw if it be ossified, and divides the sub-pubic ligaments at the same time, and sees that the bones are well separated. He plugs for hæmorrhage with gauze, and thinks that wounds of bladder and vagina are easily avoided. Forceps are used for delivery. He does not advise either osseous suture or the plaster bandage, using a simple dressing and keeping the legs tied together. Nothing must be placed between the flaps of the wound.

Morisani prefers symphysiotomy to embryotomy with a living foetus, and that it should replace Cæsarean section as an operation of election. Morisani's statistics are—

						Mortality—
241 Cases	{	Mothers	.	.	.	11.6 per cent.
		Children	.	.	.	19.9 per cent.

The conj. vera must be not below $2\frac{3}{4}$ — $3\frac{3}{8}$ in.; below such limits it is not good; the time chosen for operation, so very important, as is the technique, and the condition of the woman, which should not be precarious. Children are lost, he says—

(a.) From intervention being too long delayed.

(b.) Accident.

(c.) Means employed for extraction.

Professor Leopold (Dresden) seems not to think very highly of the operation, and does not think it suited to the emergencies of general practice, or as a substitute for embryotomy or for turning, and refers to the dangers of the operation. The conjugate must not be less than $2\frac{3}{8}$ in. to 3 in., and he prefers craniotomy or Cæsarean section.

Sänger of Leipsic does not think that symphysiotomy should be substituted for Cæsarean section. He points out the low mortality of Cæsarean section, and that the difficulty about symphysiotomy is to get exactly the right case, and at the right moment also, that recovery is protracted. The conj. vera he limits from 6 cm.—7 cm. ($2\frac{3}{8}$ — $2\frac{3}{4}$ in.), not below.

Zweifel of Leipsic, on the other hand, condemns embryotomy as long as symphysiotomy is possible, and believes that symphysiotomy will become more general. Morisani's limit of 6.5 cm. C.V. he accepts. Separating the legs of the woman after section of the symphysis is to be avoided. Zweifel has done twenty-three cases. No maternal mortality. Two children lost.

Varnier, Paris, thinks that statistics already ensure the success

of symphysiotomy, and he does not agree with Leopold. He prefers it to turning and induction of labour, which gives a mortality of 30 per cent. children, while symphysiotomy gives only 9 per cent.(?) "Medical Week," Report of Congress.

Dr. Griffith kindly gave me *Varnier's latest statistics*, which I take to be as follows:—

(a.) Mortality of cases of high forceps, turning, perforation, Cæsarean section, in contracted pelvis generally.

Mothers	.	.	.	.	.	27 per cent.
Children	.	.	.	.	.	37 "

(b.) Mortality of induction, high forceps, turning, &c., combined with symphysiotomy.

Mothers	.	.	.	.	.	27 per cent.
Children	.	.	.	.	.	30 "

(c.) Mortality of *symphysiotomy alone*.

Mothers	.	.	.	.	.	27 per cent.
Children	.	.	.	.	.	7 "

Varnier lays the greatest stress upon the reduced infant-mortality, though practically the maternal remains the same. As I said before, abroad the live child is perhaps considered more than in England, where we consider the mother first.

Thus far I have ventured to record as many of the interesting cases of symphysiotomy up to a recent date, and we have seen how these records come chiefly from the Continent or America. At present in England we have not had sufficient experience or subsequent results, I fancy, to state exactly the position of symphysiotomy among obstetric operations, or to be convinced of its superiority to other operations we know so well. But I will discuss this later.

The operation itself.—It is generally done when the os uteri is fully dilated. Lithotomy position; mons veneris and labia washed and shaved. Instruments wanted are scalpels, probe-pointed and sharp, dissecting and artery forceps, sutures, needles, strapping, gauze, antiseptics, catheter, bladder-sound, and midwifery forceps.

Special knives have been invented by Morisani, Galbrati, Pinard, and others.

Special instruments are sold to indicate the amount of separation of bones, and for maintaining their apposition afterwards.

Lithotomy position. An incision 2 cm. above symphysis through the fat of the mons veneris, ending below, just above or to one side of clitoris. Cut till the symphysis and sheaths of recti muscles are exposed. Stop all bleeding. If necessary, the recti may be divided slightly on each side near the bone. Guard urethra now or determine position by a sound. Next pass the finger behind the symphysis, between it and the bladder, and finding the little inter-pubic notch, cut gently from above downwards by small multiple cuts in the cartilage. Do not touch bone if you can help. Be very careful as you get to the lower margin of the symphysis, and divide carefully the inferior and posterior pubic ligaments. In the pregnant woman, and where the head is being pressed forcibly into the brim, separation is stated immediately to occur (and your assistants on either side must prevent this or bad laceration may occur), and at this time pretty furious bleeding from the pre-vesical plexuses occurs, and the wound may have to be plugged.

Now, apply forceps and deliver the child, seeing that, if possible, the head is in the best position for forceps. Next, clean up the wound, press the bones together, apply sutures to skin (not to the bones, apparently), and apply dressings.

A plaster of Paris casing or firm bandage may be used, or simply tie the legs together.

If you use Morisani's or Galbiati's knives, the cartilage is divided from below upwards.

The separation of the pubic bones of course increases as traction is made on the head by the forceps, apparently about 2 to 2½ in. separation being the outside limit without danger. (*Vide* Farabeuf's statistics.)

Objects of the operation.—"To increase the available conjugate for delivery, by separation of the wings of the bony pelvis."

But it must be remembered that it is never a matter of mere "inches," but varies with each particular pelvis, and possibly each foetal head; and it is a matter of circumferences, not mere diameters that we want; and to get this available increase the arc of such a circle must be increased in very considerable proportion.

Look, for instance, at the diagrams in the Year Book of Treatment, 1893, and Herman's "Difficult Labour," in which, in a diagrammatical form, the pelvis is represented and the results of separation of the bones; an imaginary sphere or disc being in the cavity and the available increase noted. Also look at Farabeuf's Tables, which I append. (*Ann. de Gyn.*, t. 38, 1892, p. 404.)

Farabeuf's Statistics.

ORIGINAL.	SEPARATION.	CONJ. VERA AVAILABLE.
5 cm. = 2 ins. .	$\left\{ \begin{array}{l} 5 \text{ cm.} = 2 \text{ ins.} \\ 6 \text{ " } = 2\frac{3}{4} \text{ " } \\ 7 \text{ " } = 2\frac{1}{4} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 7.3 \text{ cm.} = 2\frac{3}{4} \text{ ins.} \\ 7.9 \text{ " } = 3\frac{1}{8} \text{ " } \\ 8.5 \text{ " } = 3\frac{1}{4} \text{ " } \end{array} \right.$
6 cm. = 2 $\frac{3}{8}$ ins.	$\left\{ \begin{array}{l} 5 \text{ " } = 2 \text{ " } \\ 6 \text{ " } = 2\frac{3}{8} \text{ " } \\ 7 \text{ " } = 2\frac{1}{4} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 8.1 \text{ " } = 3\frac{1}{4} \text{ " } \\ 8.6 \text{ " } = 3\frac{3}{8} \text{ " } \\ 9.1 \text{ " } = 3\frac{1}{2} \text{ " } \end{array} \right.$
7 cm. = 2 $\frac{3}{4}$ ins.	$\left\{ \begin{array}{l} 5 \text{ " } = 2 \text{ " } \\ 6 \text{ " } = 2\frac{3}{4} \text{ " } \\ 7 \text{ " } = 2\frac{1}{2} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 8.9 \text{ " } = 3\frac{1}{2} \text{ " } \\ 9.3 \text{ " } = 3\frac{3}{4} \text{ " } \\ 9.8 \text{ " } = 3\frac{7}{8} \text{ " } \end{array} \right.$
8 cm. = 3 $\frac{1}{4}$ ins.	$\left\{ \begin{array}{l} 5 \text{ " } = 2 \text{ " } \\ 6 \text{ " } = 2\frac{3}{4} \text{ " } \\ 7 \text{ " } = 2\frac{1}{2} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 9.7 \text{ " } = 3\frac{7}{8} \text{ " } \\ 10.1 \text{ " } = 4 \text{ " } \\ 10.5 \text{ " } = 4\frac{1}{8} \text{ " } \end{array} \right.$
9 cm. = 3 $\frac{1}{2}$ ins.	$\left\{ \begin{array}{l} 5 \text{ " } = 2 \text{ " } \\ 6 \text{ " } = 2\frac{3}{4} \text{ " } \\ 7 \text{ " } = 2\frac{1}{2} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 10.6 \text{ " } = 4\frac{1}{8} \text{ " } \\ 10.9 \text{ " } = 4\frac{1}{4} \text{ " } \\ 11.3 \text{ " } = 4\frac{3}{8} \text{ " } \end{array} \right.$
10 cm. = 4 ins.	$\left\{ \begin{array}{l} 5 \text{ " } = 2 \text{ " } \\ 6 \text{ " } = 2\frac{3}{4} \text{ " } \\ 7 \text{ " } = 2\frac{1}{2} \text{ " } \end{array} \right.$	$\left\{ \begin{array}{l} 11.4 \text{ " } = 4\frac{1}{2} \text{ " } \\ 11.8 \text{ " } = 4\frac{3}{4} \text{ " } \\ 12.1 \text{ " } = 4\frac{1}{4} \text{ " } \end{array} \right.$

Or, roughly, that in—

2 ins. pelvis separation = 2 ins. to get 2 $\frac{3}{4}$ C.V.	
2 $\frac{3}{8}$ " " " = 2 " " 3 $\frac{1}{4}$ "	
2 $\frac{1}{4}$ " " " = 2 " " 3 $\frac{1}{8}$ "	
3 $\frac{1}{4}$ " " " = 2 " " 3 $\frac{5}{8}$ "	
3 $\frac{1}{2}$ " " " = 2 " " 4 $\frac{1}{8}$ "	
4 " " " = 2 " " 4 $\frac{1}{2}$ "	

Or it takes 3 ins. separation to get increase of 1 in. in available C.V.

Looking at these figures and tables, it requires a great separation of pubic bones to give an appreciable increase, and this increases with such separation; also, in high degrees of contraction such separation would be beyond the limits of safety, seeing that probably a separation beyond 1 $\frac{1}{2}$ to 2 in. is dangerous, and the operation seems out of the question with a pelvis below 3 in. C.V.

Symphysiotomy on the Cadaver.—Some months ago, being interested in this matter, I performed the operation in the post-mortem room in twenty-seven cases, using ordinary instruments, and trying to imitate in a manner Farabeuf's experiments. I had discs of wood of varying diameters, using

them as gauges of the amount of separation of the bones, and the increase allowed, after section of the symphysis. I freely admit that such experiments were somewhat rough, but it seemed to me that something might be learned even on the cadaver as to the difficulties and results of the operation. My cases varied between the ages of twenty-four and forty-nine. None were, or had been recently pregnant, and possibly the conditions between life and death made vast differences in the results. As to the difficulties, I came to the following conclusions:—

(a.) It was not easy to divide in the line of the cartilage, which is irregular, but seems always present.

(b.) There was a danger of bruising the cellular tissue behind the symphysis.

(c.) I injured the bladder in two cases.

(d.) I injured the urethra and vestibule, and lacerated the vulva in three cases.

(e.) In the corpse no separation took place after section, and great force, such as abduction of the thighs or pressure upon the iliac crests, was required to produce any appreciable separation.

(f.) In two cases the anterior sacro-iliac ligaments were torn, and in one case the joint opened.

(g.) The separation, to get any marked increase in capacity, endangered the pelvis as a whole.

None of my cases were below $3\frac{1}{2}$, and the average gave 4 in. before operation in the *conj. vera*.

I found that forcible separation gave me—

(a.) Separation 2 in. allowed passage of disc $\frac{1}{4}$ to $\frac{1}{2}$ in. larger.

(b.) 3 in. allowed $\frac{3}{4}$ to 1 in. larger disc, but it required great force to produce such separation.

Considering the above, and fully recognising the conditions, questions, and considerations, the following occurred to me:—

(a.) What is the difference between such cases on the cadaver and those in connection with a living woman and pregnancy as regards the ease of operation?

(b.) Is the spontaneous “flying apart” of the bones a fact, as stated, in the pregnant condition?

(c.) To what degree can we separate the bones without danger to the integrity of the pelvis?

(d.) It is evident that the more contracted the pelvis the greater must be the separation, to be of any value, and such may be dangerous.

(e.) The operation is not an easy one and takes time. I had to saw through the symphysis in one case. Would it there-

fore be ever an emergency operation in the hands of those without any previous experience, or in desperate cases?

(*f.*) Are not the after effects, as proved by reports of cases, often serious, and the risks as great to the woman as other operations which we have proved by experience to be good?—*e.g.*, embryotomy, Cæsarean section.

(*g.*) Considering such operations, and especially induction of labour, does or can symphysiotomy replace them—at all events, in cases we can watch?

(*h.*) In reported cases forceps fail, and even after the operation of symphysiotomy they are used for extraction, and high forceps operation is not without risk, and their repeated application is bad.

(*i.*) Symphysiotomy is a serious operation.

(*j.*) Its limits of applicability are small; only for cases of slight contraction, never for high degrees, or pelves obliquely or irregularly deformed; and such cases are better treated by induction when we can watch them, or by craniotomy or Cæsarean section in emergency.

(*k.*) Is the mortality of the mothers in any way decreased? and we consider the mother in England at least before the child. The mortality of the children is certainly lessened by symphysiotomy, but is there not a greater risk to mothers than in such an operation as craniotomy, while the risk to the mother should be *nil*?

(*l.*) If pregnancy supervenes again—and why not?—are you to repeat the operation of symphysiotomy? In Cæsarean section sterilisation is of course always done, and the risk of another such operation settled for ever?

(*m.*) The child must be alive at time of operation, and if it be lost, the conservative object of the operation has failed.

Indications for the Operation.—Looking generally at the cases both in England and abroad, the fact strikes me that in France, at all events, symphysiotomy seems to be done too often. I am open to correction, of course, but I object to cases being kept apparently exclusively for this operation, and cases which I fancy, in England at least, we could have delivered by other means, with as good results to mother and child; for in cases which we can watch there can be no question about the priority of induction of labour.

Many of the French cases seem to me to have been ordinary forceps-pelves. Naturally the results appear good, and of the religious question I am fully aware; but we, too, consider the infant's life and abhor its destruction.

Then, too, for desperate pelves, $2\frac{1}{2}$ and below, symphysiotomy

is out of the question entirely. Again, it is not an emergency operation, and in bad obstructed labour cases, with exhaustion, possibly already septic, and after repeated interference with forceps, &c., I fancy the risks of such an operation would be very great. If the child is dead before you begin, what is the object in the operation? Finally, you have to use forceps to deliver, and consequently a particular stage of labour is necessary.

I propose the following points, in considering the operation, as the necessary conditions.

(a.) The woman must be at full term.

(b.) She must be in labour, and the cervix fully dilated.

(c.) It must not be a desperate case. Previous exhaustion, obstructed labour, high temperature, sepsis, contra-indicate it.

(d.) The child must be alive when the operation is commenced.

(e.) The pelvis must not have a conj. vera below 3 inches.

(f.) Finally, the separation must never exceed 2 inches.

Dangers, Complications, &c.—I am sure it is not an operation without danger. You run the risk, as the cases given show, of hæmorrhage at the time, serious lacerations of soft parts, bruising of tissues, injuries to bladder or urethra, injuries to the bones, and subsequent necrosis or failure of union. Possibly, finally, hopeless damage to the pelvis and its joints.

Sequelæ.—At present we cannot state, until we hear further of the ultimate results of cases, what may occur, and if such separation of important bones leads to later trouble with walking or endangers the pelvic girdle as a whole. I am inclined to think this may be a serious consideration: subsequent experience may help us to prevent such.

Summary and Conclusions.—Finally, with regard to the foregoing remarks, let me state here that I do not intend this paper as a criticism, nor do I set myself up as an authority upon a subject in which I have little or no experience; but I fancied that the history and a few cases and statistics together with a description of this new operation, might be of interest to some, as it is to me.

Still, in a way, looking at these cases, and the results which have been obtained at least abroad, symphysiotomy occupies a position as an obstetric operation which it has never held before, though it is not a new operation. At present, it would be unwise of any one to form a definite opinion as to its place among such operations till we get more experience. In cases of this kind, two great mistakes are often made—operators either perform new operations which they hear of on cases for

which it was never intended, perhaps in enthusiasm rather than error, or they at once decry for ever such an operation or method of treatment without ever giving it a fair trial. We, as Englishmen, wish to be fair and unbiassed in such a question, and the ultimate results and proper records of these cases of symphysiotomy can alone settle that.

In the meantime, not that I wish to in any way cry down the operation, it seems to me that it must be ever an operation whose limits of applicability are small, suited, as I have said, to the slighter forms of contraction, and with a woman in labour at full term, the child alive, where forceps fail to deliver, and whose condition must be good at the time we see her.

As to the much-argued question of its replacing Cæsarean section, I think it never will, since symphysiotomy is but for the slighter forms of contraction, not for badly or hopelessly deformed pelves. Neither, I fancy, can it replace the induction of premature labour, at all events as regards the mother. Surely for slight forms of contraction with a living child, in a case that we can watch, and whose previous obstetric history we know, what better results can be obtained than that by induction of labour? Symphysiotomy is only for the full-time case.

With regard to craniotomy, perhaps it comes into the field of argument. Who wishes more than we do to get rid of such an operation as regards the child? But surely the mother's life is the more serious consideration, and craniotomy, as an operation for which it is intended, should be without risk to the mother. The child we lose, I admit, but symphysiotomy does not invariably save both. Maternal mortality is the same. Certainly the infant mortality is remarkably lowered, I admit, but at what risks? That there are dangers and bad sequelæ of this operation I am convinced. It only remains for statistics and cases in future to show us what these may be.

Then, too, it is not a small operation. It takes a long time; it needs skill, assistants, appliances, and instruments, even perhaps previous experience, and at present it cannot be one fit for the emergencies of general practice or in neglected or desperate cases. Shall it be, then, a mere operation of experts and hospitals? At present we cannot settle the question, but certainly suitable cases seem few and far between.

Then, again, a serious objection to my mind is its possible repetition. Can we divide a symphysis twice, or thrice, or yearly?—for, as I have said, sterilisation in symphysiotomy is impossible, unlike Cæsarean section.

Again, as to its mortality, maternal and infantile, maternal does not seem, according, at least, to Varnier, to differ much. Certainly, and I admit his point with pleasure, the infant mortality is lowered markedly.

Finally, as to its after effects, these we do not at present know satisfactorily, and it is only by really properly recorded cases, good and bad, that we can form a true judgment for our future guidance.

ON THE
ASSOCIATION OF CARDIAC MALFORMATIONS
WITH OTHER CONGENITAL DEFECTS.

BY
ARCHIBALD E. GARROD, M.D.

In the valuable monographs which have been written upon the subject of congenital heart disease, it is seldom that any allusion is found to the occurrence, in association therewith, of developmental errors in other parts of the body, although, on account of the dual origin of the cardiac lesions in simple malformation and in foetal endocarditis, such associated defects are of considerable interest. Nor are the cases in which they are met with so rare as might be supposed, seeing that they must be regarded as exceptional examples of what is in itself a rare disease.

During the past few years the following three cases have come under my own observation, in which cardiac lesions, obviously of congenital origin, were associated in one instance with ocular colobomata, in another with malformation of the hands, and in the third with congenital idiocy.

I. The first case was that of Alice G., aged 15 years, who was brought to the West London Hospital in November 1892. Her mother gave the following family history :—

Neither she nor her husband had suffered from rheumatic fever, but another daughter had had no less than four attacks of that disease, and had also suffered from chorea; her heart was seriously affected, and she died at the age of ten years in the course of the fourth attack. A first cousin had also died of heart disease at the age of seven.

The patient, who was the eldest of the family, was almost black at birth, and had always been short of breath on the slightest exertion. Otherwise her health had been fairly good, and she

had safely passed through attacks of scarlatina and of German measles. She had never suffered from rheumatism, but complained of pains in her knees at times. She exhibited a conspicuous degree of cyanosis, and her lips were very blue. Both her fingers and toes were blue and much clubbed.

The heart's apex was situated near the nipple-line, and no obvious increase of the cardiac dulness towards the right was made out. A very loud blowing systolic murmur was heard all over the cardiac area, which was somewhat musical over the sternum, but had its maximum intensity in the pulmonic area. It was heard only feebly at the apex and at the right cardiac base. The second sound was greatly accentuated in the pulmonic area.

The patient had in addition colobomata of both irides, and, as ophthalmoscopic examination showed, of both choroid membranes also.

II. The second patient, Amos S., aged twelve months, was brought to the out-patient department of the Hospital for Sick Children, Great Ormond Street, in January 1894.

The mother stated that she herself had never had rheumatism, and she had no cardiac murmur, but her mother and more than one of her sisters had suffered from rheumatic fever.

The child was very rickety and had bronchitis; he exhibited a slight degree of cyanosis of the hands and feet, but the fingers and toes were not clubbed. A loud systolic murmur was heard all over the cardiac area, which had its maximum intensity at the left base, at a little distance from the edge of the sternum. The ears were prominent and their shape was rather peculiar.

The thumb was completely wanting from the right hand, and no metacarpal bone could be felt. Both radius and ulna were present. The left thumb was unduly small, but was complete in all its parts, a fact which seemed to exclude the idea that the absence of the right thumb was due to intra-uterine amputation.

Subsequent inquiry by letter elicited the information that this child died during an attack of bronchitis in April 1894.

III. The third patient, Annie M., aged one year and six months, was also an out-patient at the Hospital for Sick Children. There was no family history of rheumatism in her case.

The child had been blue from birth, and when seen was very cyanotic, and had conspicuous clubbing of the fingers and toes; the nose was also blue and clubbed.

A systolic murmur was heard all over the cardiac area in front, and also over the back of the chest.

The child showed evident signs of mental deficiency, could not stand, and was spiteful and strange at times. Her countenance was that characteristic of the "Mongol" type of idiocy. She was subject to fits, which occurred about every alternate day, in the course of which her colour became very dark, and her tongue, which was protruded from her mouth, was almost black.

This child died at her home in the country in May 1891.

The first of the above cases not only illustrated the association with congenital heart disease of double coloboma of the iris and choroid—an association of which I have not been able to find any recorded example—but also exhibited other points of interest.

The presence or absence of a family history of rheumatism is a point about which I have for some time made inquiries in cases of congenital heart disease, in view of the part played by foetal endocarditis in its causation, and in no less than eleven out of a series of fifteen cases of which I have notes, there was a distinct history of rheumatic fever in near relations of the patients, *i.e.*, either in the patients' grand-parents, uncles or aunts, brothers or sisters. The mothers of four patients had themselves suffered from acute rheumatism, and in one instance an attack had occurred during the seventh month of pregnancy. In this case the child had physical signs strongly suggestive of pulmonary stenosis, *viz.*, a systolic thrill in the pulmonic area, and a clanging systolic murmur, loudest in that situation. There was neither cyanosis nor clubbing of the fingers or toes.

In nine cases the mothers' hearts were examined, but in only one instance was there evidence of valvular disease, after no less than eight attacks of acute and subacute rheumatism.

In four cases the mothers' parents, brothers, or sisters had suffered from rheumatic fever; in two others the inheritance was from the father's side, and in one instance the disease had occurred on both sides of the family.

This proportion of rheumatic family histories is remarkable, but the total number of cases is small. It is interesting to note that in two out of the three cases above described there was a rheumatic family history in addition to associated malformations.

A further point of interest in the case of Alice G. was the marked accentuation of the second sound in the pulmonic area. In the present state of our ignorance of the physical signs which correspond to the different varieties of congenital heart disease,

any physical sign which promises to be of diagnostic value is worthy of careful attention, and I believe that this conspicuous accentuation of the second sound at the left base, which is sometimes attended by a palpable valve shock, will prove to have a definite diagnostic significance.

I have notes of two other cases in which it was observed, but have had no opportunity of ascertaining the nature of the lesion present *post-mortem*.

1. Edwin F., aged 6 years, was cyanotic and presented clubbing of the fingers and toes. The cardiac dulness was enlarged to the right of the sternum. A systolic thrill followed by a distinct valve shock was felt in the pulmonic area, and a loud blowing systolic murmur was heard, which was much louder at the left base than elsewhere.

The second sound was very loud and ringing in the pulmonic area.

2. Louise F., aged 15 years, the child of a rheumatic mother, who herself had mitral disease, was cyanosed, and showed conspicuous clubbing of the fingers and toes. There was a systolic pulmonic thrill and a loud systolic murmur, with its maximum intensity in the same area, where also the second sound was much accentuated.

It will be noticed that in all these cases the patient had survived early childhood; in all there was marked cyanosis and clubbing, and in all the physical signs were strongly suggestive of pulmonary stenosis.

The significance of the accentuation of the second sound thus suggested is borne out by the few observations bearing upon this point which I have met with in the literature of the subject.

In his classical work on malformations of the heart (2nd edition, p. 54), Peacock records a case in which, in addition to a systolic thrill and murmur at the left base, a loud ringing second sound was heard over the middle of the upper part of the sternum. The case was found *post-mortem* to be one of pulmonary stenosis, the orifice of the artery being constricted by a muscular band, covered with fibrous tissue, and studded with warty vegetations. This constriction was situated below the valve curtains, which, although only two in number, were free from disease, and freely admitted the forefinger. The septum ventriculorum was incomplete, and the ductus arteriosus was pervious. The mitral curtains were opaque, thickened, and studded on their auricular surfaces with wart-like vegetations.

Peacock remarks, when speaking of the physical signs of pulmonary stenosis (*ibid.*, p. 193):—"Generally in such cases the

aorta is unusually large, and from the powerful reaction of the valves during the diastole of the heart, a loud ringing second sound is heard on listening at the upper part of the sternum."

Peacock's case supports the view of Clifford Allbutt (quoted by Eichhorst), that the sign under discussion indicates obstruction in the conus arteriosus of the pulmonary artery.

Gerhardt (*Lehrbuch der Auscultation und Percussion*, 1883, p. 308) mentions that he has twice met with this sign in cyanotic adults, and in one case which came to an autopsy there was pulmonary stenosis, but of a different type. The valve curtains themselves were fused together into a funnel, but were not thickened or rigid. The foetal orifices were closed, and the right ventricle was much hypertrophied. He regards the pulmonary valve shock as a sign of a moderate degree of change in the valves, with adequate compensation. In this case, the valve shock, which was distinctly pulmonic, could hardly have been produced in the aorta, as Peacock suggests.

Leuch (*Zeitschrift f. klin. Med.*, 1892, xxi. p. 142) also looks upon this as a sign of pulmonary stenosis, but not as indicating the precise seat of the narrowing.

It does not appear to me that any satisfactory explanation has been yet offered of the deviation of these cases from the common type of pulmonary stenosis, in which there is a feeble second sound in the pulmonic area.

To return after this lengthy digression to the subject under consideration, I have made a somewhat extensive search for cases illustrating the association of cardiac and other malformations, but with only moderate success, partly because the titles of the papers in which they are recorded frequently give no clue to the fact. Seeing that several different malformations are sometimes simultaneously present, it seems best not to attempt any systematic classification of the defects. The records found may be briefly epitomised as follows:—

1. Male, 23 years. Cyanosis and cardiac murmurs. Clinical evidence of complete transposition of viscera.—*E. Barié, Bull. et Mem. Soc. Med. des Hôp.*, 1894, xi. p. 486.

2. Male, 10 years. Cyanosis; clubbing. Loud systolic murmur, loudest in second *right* intercostal space. Clinical evidence of complete transposition of viscera.—*Arthur Davies, Clin. Soc. Trans.*, 1892, xxv. p. 300.

3. Male, 6 weeks. Transposition of auricles and great vein. Complete transposition of viscera.—*Hickman, Path. Soc. Trans.*, 1868-69, xx. p. 88.

4. Female, 23. Malformation and inflammatory lesions of heart. Pulmonary veins from right lung opening into left auricle. Patient had had rheumatism. Complete transposition of viscera. Nine spleens.—*Hickman, ibid.*, p. 93.

5. Male, 8 days. Right ventricle rudimentary, not communicating with auricles. Incomplete ventricular septum. Two superior venæ cavæ. Transposition of viscera. Double hare-lip. Absence of spleen.—*Valleix, Bull. de la Soc. Biol.*, 1834, ix. p. 253.

6. Male, died at birth. Incomplete auricular and ventricular septa. Pulmonary stenosis, apparently resulting from endocarditis. Transposition of veins. Anasarca. Transposition of viscera.—*Virchow, Virchow's Archiv*, 1861, xxii. p. 426.

7. Male, 20. Great deficiency of cardiac septa, and other abnormalities. Transposition of lungs and dextrocardia. Four spleens.—*Cipriani, Lo Sperimentale*, 1890, lxvi. p. 127.

8. Defect of septum ventriculorum. Two aortic curtains. Cyclops.—*Hugo Preisz, Beiträge zur path. Anatom. und zur allgem. Pathologie*, 1890, vii. p. 251.

9. Male, 20 months. Systolic thrill in third and fourth left intercostal spaces. Loud systolic murmur. Rickets. No cyanosis or clubbing. *Post-mortem*, tricuspid incompetence. Aortic valves irregular. Congenital ptosis of left eye.—*J. Thompson, Edinburgh Hospital Reports*, 1894, ii. p. 292.

10. Male, 2 days. Pulmonary stenosis and incomplete ventricular septum. Boat-shaped head. Hare-lip and cleft palate.—*Hugo Preisz, loc. cit.*, p. 266.

11. Female, 5 years. Systolic murmur, loudest at level of third left costal cartilage. Cyanosis and clubbing. Cleft palate.—*F. Warner, Med. Times and Gazette*, 1882, i. p. 61.

12. Female, 4 days. Single ventricle. Two aortic valves, Meningo-encephalocele protruding from mouth. Hare-lip and cleft palate.—*Lichtenberg, Path. Soc. Trans.*, 1867, xviii. p. 250.

13. Aged 24 hours. Patent septum ventriculorum. Single arterial trunk with three valves. Encephalocele at back of skull.—*Christopher Heath, Path. Soc. Trans.*, 1864, xvi. p. 62.

14. Female, 6 months. Pulmonary stenosis. Valves thickened and irregular. Small accessory tragus in front of left ear. Congenital dimple over coccyx.—*J. Thompson, loc. cit.*

15. Male, 3 years. Systolic murmur at cardiac base, loudest towards aortic cartilage and right sterno-clavicular joint. No increase of dulness. Marked deformity of right hand, bones of forearm complete. Metacarpus in two divisions. Middle finger absent.—*F. Warner, loc. cit.*

16. Male, born dead. Incomplete ventricular septum. Absence of left radius. Defect of diaphragm.—*Hugo Preisz, loc. cit.*, p. 257.

17. Male, 17. Systolic murmur in pulmonic area. Slight cyanosis. Semi-idiotic. Ichthyosis. Mother had acute rheumatism at seventeen, and had mitral regurgitation. A sister, ichthyosis.—*G. Leuch, Zeitschrift f. klin. Med.*, 1892, xxi. p. 142.

18. Incomplete septum ventriculorum. Interruption of œsophagus. Absence of right radius.—*Edgar Willett, Path. Soc. Trans.*, 1894, xlv. p. 78.

19. Female, 10 weeks. Patent foramen ovale. Tricuspid valves much beaded. Persistent duct of Cuvier. Incomplete septum ventriculorum. Imperforate anus. Recto-vaginal fistula.—*Chaffey, Path. Soc. Trans.*, 1884–85, xxxvi. p. 175.

20. Male, 4 years. Atresia of pulmonary artery. Aorta arising from right ventricle. Incomplete septum ventriculorum. Horseshoe kidney.—*S. H. Habershon, Path. Soc. Trans.*, 1887–88, xxxix. p. 71.

21. Female, 5 weeks. Defective ventricular and auricular septa. Pulmonary veins opening into vena cava superior. Aorta and pulmonary artery springing from right ventricle. Diverticulum of œsophagus. Absence of spleen. Peritoneal abnormalities.—*Alois Epstein, Zeitschrift f. Heilkunde*, 1886, vii. p. 308.

22. Male, born dead. Absence of ventricular septum. Rudimentary auricular septum. Defect of diaphragm in left hinder part.—*Hugo Preisz, loc. cit.*, p. 251.

23. Female, 2 days. Pulmonary stenosis. Incomplete septum ventriculorum. Left superior cava opening into left auricle. Malformation of pulmonary valves. Congenital omphalocele.—*Hugo Preisz, loc. cit.*, p. 270.

24. Male, 8 years. Physical signs suggestive of pulmonary stenosis. Congenital deaf-mute.—*G. Leuch, loc. cit.*

25. Mr. Edgar Willett has kindly brought to my notice a case at the Belgrave Hospital for Children, under the care of Mr. Clinton Dent, to whom I am much indebted for permission to refer to it here. The patient, a boy aged six years, exhibits the association of congenital heart disease with hypospadias. In the pulmonic area a loud murmur is heard, continuous throughout the cardiac cycle, but varying in intensity. In the same area a well-marked thrill is felt. At the apex the murmur is only feebly heard. There is neither cyanosis nor clubbing of the fingers.

I have not included in the above list cases of extreme double or single monstrosity, good examples of which are furnished by V. Buhl (*Zeitschrift f. Biologie*, 1880, xvi. p. 215), and by Hugo Preisz in the paper above quoted.

The small number of recorded cases found is calculated to give the impression that the rarity of the associations under discussion is greater than it really is. Warner met with other defects in five out of twelve, and Hugo Preisz in seven out of seventeen cases of congenital heart disease, but some of the cases described by the latter belong to the category of monsters. I have myself met with the three cases above described among some twenty cases noted.

It will be noticed that in no less than six of the above instances there was complete, and in a seventh partial transposition of viscera, but it is noteworthy that in these cases the cardiac lesions were by no means limited to malformations by transposition.

In four cases there were splenic abnormalities; in Case 4, nine spleens; in Case 7, four; and in Cases 5 and 12 no spleen at all.

Hare-lip, cleft palate, or the two combined, were present in Cases 10, 11, and 12, and malformations of limbs in Cases 15, 16, and 18, as well as in my second case.

I am indebted to my colleague, Mr. J. H. Morgan, for the account of two cases of several which have come under his notice. In one instance, a child, aged $4\frac{1}{2}$ years, was brought to him with cleft palate, upon which he decided not to operate on account of a congenital cardiac defect. The second case was that of a girl with congenital heart disease and congenital talipes.

It is a matter of considerable interest to ascertain how far the presence of associated deformities may be relied upon as showing that the cardiac lesion is due to malformation rather than to foetal endocarditis, and the eighteen cases included in

the above series in which the heart was examined *post-mortem* yields some interesting information upon this point.

In five out of the eighteen cases (Nos. 4, 6, 9, 14, and 19) there were found conditions which were held to indicate clearly the occurrence of foetal endocarditis; but in three of these (Nos. 4, 6, and 19) there were other abnormalities, which can hardly be looked upon as secondary to the inflammatory lesions. viz., abnormal opening of the pulmonary veins, transposition of the great veins, and persistent duct of Cuvier. In Mr. J. Thompson's cases (Nos. 9 and 14) foetal endocarditis sufficed to explain all the appearances, but the associated defects were of a very minor kind.

It would obviously be unsafe, therefore, to argue from the presence of associated defects that foetal endocarditis has had no share in producing the cardiac lesions in any given case; but, on the other hand, it seems clear that they point strongly to the presence of primary malformation of the heart. The above examples tend to support the view that, in addition to cases of pure malformation, of pure endocarditis and of endocarditis with secondary failures of development, there is a fourth group of cases in which the malformation is primary, and the endocarditis is a secondary event.

Rokitansky held this opinion, and even maintained that the special liability of the right heart to intra-uterine disease is merely due to the frequency of malformations of that part which predispose to endocarditis.

The comparative infrequency of endocarditis in cases in which congenital defects are present is further illustrated by the fact that pulmonary stenosis, which is at the same time the commonest of congenital lesions, and probably the commonest result of foetal endocarditis, was only present in four out of the eighteen cases examined *post-mortem* (Nos. 6, 10, 14, and 23), and pulmonary atresia in one other case (No. 20). This supports the statement of Rauchfuss in his classical article in Gerhard's "*Handbuch der Kinderkrankheiten*" (Bd. iv. Abth. 1, p. 85), that in cases of pulmonary stenosis associated deformities of the trunk, limbs, &c., are seldom met with.

However, it must not be forgotten that the minor degrees of pulmonary stenosis are compatible with a considerable length of life, and in some of the non-fatal cases the physical signs suggested that form of disease.

A CASE OF PERICÆCAL SUPPURATION

FOLLOWED BY

INTERESTING CEREBRAL SYMPTOMS—RECOVERY.

WITH REMARKS.

BY

E. PERCY PATON.

The case, the notes of which are here given, I have ventured to think worth recording, as presenting several points of interest.

W. J. H., clerk, æt. 13 years, was admitted into Matthew Ward on June 15, 1893, under Dr. Hensley's care, by whose kind permission I am able to use the notes of his case. His *history* was, that at Easter 1893 he had a bad attack of diarrhœa, lasting a week, which left him with a tendency to pain in the lower abdomen. Four weeks before admission he was seized with pain in this region, but especially in the right iliac fossa. The pain was sufficiently acute to confine him to bed for two weeks, since which time he had been up, though still suffering some pain.

His *previous history* was good, and there was no evidence of tubercular or other taint in his family. On *admission*, no physical signs were found except in the abdomen, which was moderately distended and did not move on respiration. Many dilated veins were noted on its surface, and there was tenderness and fulness in the right iliac fossa, but no tumour to be felt.

June 20.—A nodular feeling was noted in the right iliac fossa, but no nodules generally in the abdomen.

July 25.—Some free fluid was observed in the peritoneum, otherwise his condition was unchanged, except that he was steadily losing flesh. His temperature till now had been irre-

gular, but never high, the highest point reached being between 100° and 101° F. This state of things continued till the beginning of September, when he began to improve, and got up and about, though the nodule in the right iliac fossa still remained, and his temperature was still irregular.

On *October 10*, the tenderness and pain in the iliac fossa returned, and there was more distension, obliging him to return to bed. His weight was now 4st. 7lbs.

October 23.—For the past three nights had been having delusions. Was taking belladonna from September 7th till October 20th, when it was stopped.

October 28.—Still has delusions.

November 26.—Had an epileptiform fit and was unconscious for two or three minutes. The abdominal tumour was less prominent, but his weight was only 3st. $12\frac{1}{2}$ lbs., and he was much weaker. Nothing further was found in the lungs or elsewhere, and the advisability of exploring the abdomen was considered, but his father took the boy home on December 3rd. The diagnosis made was, doubtfully, perityphlitis, with tubercular peritonitis as an alternative.

He remained at home till January 10, 1894, when he came under my care at the Mildmay Mission Hospital, Bethnal Green.

His condition then was one of extreme emaciation; but there were no objective signs anywhere, except a considerable fulness and resistance in the right iliac fossa, with a very obscure sense of fluctuation. He had a fit on the day of admission, the nature of which was uncertain, but his tongue was bitten and he was unconscious three or four minutes.

January 15.—The last two days has been becoming mentally dull and very obstinate, absolutely refuses to take any food, and has to be forcibly fed; he resists every effort to examine him. He has frequent, almost constant, twitching of the floor of the mouth, especially on the right side. Ophthalmoscopic examination of the left fundus showed nothing abnormal.

January 25.—Another fit, with marked twitching of the right side of the face. No general convulsions.

February 8.—Had several similar fits during the preceding fourteen days. The abdominal swelling was opened and a large quantity of sweet pus was let out, the cavity containing which extended for some distance into the loin. The next day fæces began to pass by the wound. His mental condition now became much clearer and he took food much better.

February 16.—Has had several fits, in one of which the left side of the face, as well as the right, was said to be affected. There is now frequent clonic spasm of the right side of the

lower half of the face and tongue. During the next few weeks the twitching on the right side of the face became continuous, but was more marked just before a fit, of which there were several, but each only lasting a few minutes. Still losing weight.

March 21.—The constant twitching still continued. Right side of the tongue seems weak. No other paralysis or spasm. No optic neuritis, vomiting, or headache, and no signs of chest mischief. Dr. H. M. Bowman saw the case with me, and the question of trephining over the left motor area was discussed; but owing to the boy's feeble general condition, it was decided to do nothing, but try and improve the general condition by feeding, cod-liver oil, &c.

During the next few weeks he began to put on weight, but the spasms spread from the lower to the upper right facial muscles, while those first affected became palsied. He also became quite aphasic.

April 19.—The twitching of the facial muscles stopped, leaving a good deal of paresis instead. From this time, however, he steadily improved, and though there were several returns of spasm and some fits, these gradually became less frequent, the paralysis gradually disappeared, as did the aphasia, and the abdominal wound contracted to a mere sinus, so that on July 2nd the boy was sent to the country, his weight being then 5 st. 8½ lbs.

He was last seen on *October 25th*, and was then fat and well, and except for a little slowness of speech, and a sinus in the groin discharging a small quantity of watery pus, showed no signs of his former troubles.

Remarks.—One of the points which I wish to say a few words about is the nature of the cæcal trouble. During its whole course, except possibly just before the boy came under observation, the symptoms were remarkably chronic, and there were never any signs of the acute suppuration so often seen in perityphlitis. This chronicity, along with the irregular temperature, the progressive loss of flesh, and the nodule felt for so long a time in the right iliac fossa, seem to point rather in the direction of a tubercular origin of the trouble than to an ordinary appendicitis. If, too, it were the appendix affected by tubercular disease which was the original seat of trouble, it would be much easier to explain the pus in the abscess being uncontaminated with fæces when first opened, than if ulceration of the cæcum itself were present. It is also easier, with this assumption, to explain the early closing of the fæcal fistula.

Kelymack, in his book on "The Pathology of the Appendix Vermiformis," says that primary tuberculosis here is very rare, but is not unfrequently found in company with similar lesions elsewhere. Fenwick and Dodwell, in the examination of 2000 cases of phthisis at Brompton, found the appendix to be the only other part affected in 17 cases only, and in one or two of these there was some doubt as to the true nature of the lesion, and in none, I believe, was there any abscess formation. So that if tubercle were really the cause of the pericæcal suppuration in this case, it is certainly an uncommon cause, and little is usually said about it.

The other points I wish to call attention to are the nature and the course of the nervous lesion. First as to its nature. In spite of the absence of all general symptoms of cerebral tumour, such as optic neuritis, vomiting, and headache, it seems to me one is unable to avoid the conclusion that a new growth was the cause of the symptoms in this case. For what other lesion will explain the occurrence of spasms, strictly localised to one side of the face, spreading in a progressive manner, accompanied by occasional fits, and followed by marked paralysis of the affected muscles and aphasia, such as was seen in this boy? But if this cause of the symptoms be accepted, it seems easy to localise the tumour at the lower end of the left ascending frontal and the posterior end of the third frontal convolutions, where the centres for speech and for movements of the face are situated. A lesion here, it seems to me, would explain all the symptoms.

Two other alternative causes were considered at the time, namely, abscess and localised meningitis; but there seemed no special indications in either of these directions, and the subsequent history seems to militate more strongly against either of these suggestions than against that of new growth. As to the nature of the growth, it seems reasonable to think it to be of the same kind as that which probably caused the cæcal trouble, namely, a tubercular mass. This view is also strengthened by the absence of all syphilitic taint, either in the patient or his family. But what appears to me the most important feature in this boy's case is its termination in complete recovery, even to the restoration of function of the paralysed muscles. This would lead one to believe that the palsy following irritation was due to gross interference, but not destruction, of the nervous elements in the motor centres, though the latter is more usually given as the cause of the paralysis which follows spasms in these cases. Cases of this kind, in which specific disease can practically with certainty be excluded, and which ultimately recover, and yet appear to be certainly examples of cerebral new

growth, seem to me to render the prognosis of cerebral tumour much more difficult than at first sight appears.

Gowers, indeed, says that arrest of growth of a tubercular mass is not infrequent, though the palsy caused usually remains; others, however, seem to take a much less favourable view of these growths.

This question of prognosis becomes still more interesting when, as in this boy, the lesion can be localised, and is in a situation where surgical measures can reach it; for one then has to decide whether active measures, and these by no means entirely free from risk, shall be undertaken or not, and any cases which diminish the certainty of a fatal prognosis increase instead of diminishing the difficulty of the decision.

THE TREATMENT OF SENILE GANGRENE.

BY

R. COZENS BAILEY, M.S.

“Clear and precise definitions of disease, and the application of such names to them as are expressive of their true and real nature, are of more consequence than they are generally imagined to be ; untrue and imperfect ones occasion false ideas, and false ideas are generally followed by erroneous practice.”—POTT.

No form of disease bears witness to the truth of the above more clearly than that which forms the subject of the present paper. It will be necessary, therefore, before considering the treatment of senile gangrene, to define as accurately as possible the extent and meaning of the term, and to classify the cases which have been grouped together under this head, on account of their all possessing the common factor of senility.

Though the older writers failed to distinguish any differences in causation, and consequently adopted a uniform inactivity in the matter of treatment, they fully recognised that the disease did not always run the same course. Thus Pott in 1790 writes, “Its progress in different subjects and under different circumstances is different; in some it is slow and long in passing from toe to toe, and thence to the foot and ankle; in others its progress is rapid and horridly painful.”

For descriptive purposes I shall arrange the cases in three main groups, according to their cause, each of which admits of several subdivisions.

CLASS I.—*Due to capillary thrombosis.*

(a.) Confined to the capillaries.

(b.) Spreading to the larger vessels.

This class contains by far the larger number of the cases, cases which are senile gangrene *par excellence*, and upon which the classical description of the disease has been based.

Here the mortification runs the typical course, commencing probably in the big toe, and slowly spreading, till one after the other, separated by periods of weeks, or even months, all or most of the toes become involved, turn black, shrivel up, become dry, hard, and mummified, finally separating, and leaving a more or less healthy granulating stump. I said slowly spreading from toe to toe, but this is hardly correct, for one of the most distinctive characters of this class, and which points clearly to its capillary origin, is that it starts independently in several places, the gangrenous process in each toe starting from its own centre. This generally shows itself first as a small black spot at the tip of the toe, and may spread till the whole toe assumes the characters described above. But the disease is most unequal in its course; in some rare cases both feet may be affected, more commonly only one; all the toes or only some, the whole toe or only part.

If the thrombosis is confined to the capillaries, the toes alone mortify; but if the process spread, and the larger arteries become obstructed, gangrene extends to the foot as well.

Brodie wrote, "I have seen mortification begin in an old man's toe, and be gradually spreading even for months up the foot and leg, without the least appearance of a line of demarcation or the least attempt at sloughing." This, which is a fairly common result, gives rise to another clinical type—mixed gangrene; for the toes, as before, generally become dry, the foot and leg, from their greater bulk, remaining moist. Proof that this form is really due to an extension of thrombosis is furnished by the pulse, which may be observed to cease in the vessels from below upwards; and as the pulsation ceases the gangrene extends, till finally a healthier condition of the vessels obtains, and a line of demarcation forms.

CLASS II.—*Due to primary obstruction of the larger arteries.*

(a.) Embolic.

(b.) Thrombotic.

It is a well-known fact that an embolus tends to lodge at some spot where, owing to the division of the artery, a sudden diminution in its calibre takes place. Thus in the lower extremity specially favourable sites are furnished by the divisions of the common femoral into superficial and deep, and of the popliteal into anterior and posterior tibial.

The sudden onset of tingling or burning pain in the limb, followed by coldness, pallor, and loss of sensation, in a patient the subject of organic disease of the heart, points to such an occurrence, and the extent of the gangrene may be fairly

accurately foretold by a local examination. Pulsation lost in the superficial femoral, while persisting undiminished in the common, indicates obstruction of the former, and will be followed by death of the limb as high up as the knee, the unobstructed profunda carrying sufficient blood to maintain the vitality of the thigh. Blocking of one or other tibial, more frequently the posterior, shown by cessation of the pulse in the corresponding vessel, results, as a rule, in death of the foot, which separates at or about the ankle, the blood supply furnished by the branch still patent being sufficient to sustain the life of the part up to that point.

Thrombosis depends upon a local condition of the artery, and is due to the deposit of fibrin upon a roughened patch in its wall, caused either by the exposure of a calcareous plate or atheromatous ulceration of the inner coat. If this takes place in the same situations as those favourable to embolus, naturally the same results follow, but the process is more erratic in its choice of site, and the extent of the ensuing gangrene consequently more difficult to foretell.

Moreover, the onset is less sudden, the pulse gradually getting less and less, not suddenly disappearing, the limb possibly for some days hangs trembling in the balance, cold and livid but still not gangrenous, dying but not yet dead.

That calcification of the arteries, Pott notwithstanding, who wrote, "It has by some been supposed to arise from an ossification of vessels, but for this opinion I never could find any foundation but mere conjecture," is a constant accompaniment of senile gangrene, no one will now deny; and thrombosis depending upon such calcification will be readily ceded as a true cause of the disease. But it may be said, Why admit embolism as a cause of senile gangrene? True, embolism occurring in the young may be followed by gangrene, but in the old this is much more frequently the case, and in them is due partly to the decay of the tissues, partly to the weak action of the heart, but much more to the inability of the rigid calcareous arteries to dilate in order to carry on the collateral circulation, and thus depending mainly upon a senile condition, rightly finds a place here.

Mortification caused by primary obstruction of the larger arteries differs, then, from that due to capillary thrombosis in that it involves a greater extent of tissue, takes place more rapidly, and does not develop from several independent foci. Constitutional symptoms are marked often from the first; the larger surface giving greater facilities for septic absorption. The gangrene is of the moist variety, death ensuing so rapidly

that there is no time for even the distal portions to dry and mummify.

The above may be taken as the usual termination of obstruction of a large artery in an aged person, but it does not always occur. Sometimes after a period of uncertainty the condition of the limb improves, the collateral circulation is established, and a small part, *e.g.* one toe, is alone too far gone for recovery, or scattered portions of skin fail to recover their vitality, undergo necrosis and slough away.

CLASS III.—*Inflammatory.*

(*a.*) Traumatic.

(*b.*) Idiopathic.

In Class I. frequently the exciting cause of the thrombosis of the capillaries is some slight injury, such as a small cut; the local blocking of these vessels necessary to restrain the hæmorrhage passing beyond the bounds of health, and in all forms the presence of dead matter in close contact with the living necessarily sets up inflammatory processes in the latter; and in some cases of spreading thrombosis this is of sufficient intensity to help in causing the death of the part. In such cases, however, the inflammation is quite a secondary affair, and gangrene would occur as certainly were it absent altogether.

But there is another class in which a low form of inflammation is the essential cause. Inflammation which healthy tissues would readily recover from here is sufficient to quench the vital spark. This it does partly by stasis in the capillaries, partly by the pressure of the exuded cells, and partly by the direct injurious influence upon the tissue cells themselves. The dead part then excites a corresponding process in the neighbouring tissue, and this in turn dies and affects that next to it; and thus inflammation is followed by death, death by inflammation, and so on up the limb, the tissues nowhere possessing sufficient vitality to resist the invading force of disease. Sometimes this inflammatory process is excited by injury, and the progress of the case is identical with that met with in younger subjects; in fact, it is a true traumatic inflammatory gangrene. Both are dependent upon a constitutional taint; in one this is senile decay, in the other alcoholic degeneration; but apart from this slight difference they are the same, the injury taking no part in the progress of the disease beyond exciting in the first place the inflammation which is its true cause.

In other patients no history of injury is obtainable, and in these cases, which I have called idiopathic, the inflammatory mischief starts round a perforating ulcer dependent upon the

malnutrition caused by diabetes or trophic disturbance, the result of nerve changes in *tabes dorsalis*.

Inflammatory gangrene is always of the moist variety, for not only are the amount involved and the rapidity of the process both too great to allow of drying, but in addition to this, the period just before death is occupied by an exudation of fluid into the parts, which are therefore, when mortification sets in, moister than natural. Septic absorption commences early, and death soon ends the scene.

Treatment.—If every case of senile gangrene could be arranged under one of the three headings which I have given, the question of treatment would still be a most difficult one. What must be said, then, when, as is the case, there are some which fall partly under one group and partly under another? Rules may be laid down for the treatment of thrombotic or inflammatory gangrene, but which line is to be followed when, as frequently happens, a senile diabetic becomes the subject of thrombosis, or a traumatic element still further complicates the case? Much must be left to individual experience, but what I wish to insist upon is, that senile gangrene is not to be looked upon as a single disease, but that the title has been made to include, and may still be allowed to include, several distinct and widely different affections, all of which justify their claims to the name, inasmuch as old age and its consequences plays an important part in the causation of each. With the understanding, then, that all is not as cut and dried as may appear on paper, I proceed to discuss the treatment under the following heads—

- (1.) Capillary thrombosis.
- (2.) Capillary thrombosis spreading to the larger vessels.
- (3.) Primary arterial obstruction.
 - (a.) With partial return of collateral circulation.
 - (b.) Without.
- (4.) Inflammatory.
 - (a.) Traumatic.
 - (b.) Idiopathic.

Treatment is either palliative or operative, but the question is not, as a rule, how shall we palliate or how operate? but shall we palliate at all or operate at all? Further, if palliate, how long? if operate, when and where? In connection with this matter it is extremely interesting to note the rules laid down by surgeons in the past.

Pott, without reference to whom it is impossible to mention the treatment of senile gangrene, discussed the question of amputation with scant courtesy as follows: "If the patient

does well, the parts will certainly drop off; if he does not, no good can rise from removing them." He, however, guardedly remarked, "When the toes are to all appearance perfectly mortified and seem so loose as to be capable of being easily taken away, it is in general thought right to remove them." This plan of masterly inactivity, supplemented by the internal administration of opium, which drug he substituted for Peruvian bark, formerly regarded almost as a specific, was held for years to constitute one of surgery's golden rules. From time to time an occasional plea for more active measures was entered.

James, in his work on "Inflammation," 1821, relates the case of a man aged sixty-eight, admitted under his care in 1817 with gangrene up to the ankle, which had repeatedly stopped and spread. Amputation was done through the thigh in order that the vessels might be cut in as healthy a part as possible, and was followed by recovery. He, moreover, puts the case for amputation clearly and forcibly in the following words: "The probability of the operation succeeding is grounded upon the fact that higher in the limb the powers of the parts may be equal to the repair of a large wound although below they are incapable of throwing off a slough." Again, in 1853 (*Medical Times*, vol. i. p. 380), Garlike relates the case of a man aged sixty-nine in whom thrombosis of the superficial femoral had led to gangrene of the foot with abscesses in the leg, and who recovered after amputation through the thigh "as near the trunk as possible." Fergusson on this occasion sounded a note of warning; and Brodie, writing in 1865, still more emphatically condemned amputation. I venture to quote his words as an authoritative utterance, fairly representing the teaching of the time: "A man has mortification of the toes, and, independently of experience, you might naturally say, 'Here is a most dangerous disease; why not at once amputate the limb?' It is probably unnecessary for me to tell you that it would be contrary to the established rules of surgery (for which I have great respect) to amputate a limb under such circumstances. I have never seen it done; I have never done it myself; but I have heard of cases in which the surgeon was—shall I say?—thoughtless enough, or ignorant enough, to venture on this summary proceeding of cutting off the leg because the toes were beginning to mortify. In every instance the stump mortified and the patient died."

Coming to more recent times, Gross in his "System of Surgery" (6th edition, 1882) advocates operation, and is the first, as far as I can discover, to suggest a choice of site on a rational basis. He recommends, if gangrene be limited to the toes, amputation

high up in the leg; if it affects the foot and ankle, removal of the limb through the lower third of the thigh.

Attention was finally drawn to the subject by Mr. Hutchinson in 1883 in a paper read before the Medico-Chirurgical Society (Trans. Med. Chi. Soc., vol. lxxvii.), in which he claims the advantages of amputation high up in all suitable cases.

Prophylactic Treatment.—Before gangrene has become absolutely established, it need hardly be said that every means should be adopted in order to prevent its onset.

To do this, the circulation must be encouraged, the patient put to bed and kept in an even temperature, the failing heart judiciously stimulated, and the feeble nutrition aided by a generous diet. Locally, the temperature of the limb should be maintained by wrapping it up in cotton-wool and surrounding it with hot-water bottles, while the circulation is still further helped by elevating the part. Elevation, however, must not be too great, but only just sufficient to encourage the venous return; for owing to the weakness of the heart and the obstruction in the arteries, it may be that the blood is only just able to reach the toes already, and in such a case this means would defeat its own ends if carried to excess.

Palliative Treatment.—Should gangrene have already supervened, the foregoing measures must be continued, in order, if possible, to check its spread, and in addition the dead parts must be rendered as inoffensive as possible. All moist applications must be avoided, and every effort made to dry up the necrosed tissues, or, if these be already dry, to keep them so. Poultices, charcoal and other, though possibly the best method of treatment known in former times, failed in this important particular, and have now been completely superseded by dry antiseptic and deodorant applications, such as iodoform and powdered boracic acid.

In the treatment by drugs no advance has been made since the time of Pott, and opium to relieve pain, and perhaps to exert some favourable action upon the moribund tissues, is our only resource.

Operative Treatment.—On this question, as already shown, opinions have differed widely in the past, and still differ with regard to both time and place.

In the pre-antiseptic days two dangers threatened the surgeon—secondary hæmorrhage, and recurrence of gangrene in the flaps, both of which were wholly attributed to the disease, in ignorance of the part played by direct contamination of the wound.

True, now-a-days either may take place, but they are to be

regarded as accidental rather than inevitable in most cases, and only as partially dependent upon the disease. Thus secondary hæmorrhage, though predisposed to by a rigid artery, may be prevented by proper attention to the ligature; and if from the brittleness of the vessel it is impossible to tie it by itself, it can be readily secured together with some of the surrounding tissues.

Recurrence of gangrene, too, can, in the great majority of cases, be prevented by antiseptic precautions and a proper choice of site for operation; but there still remain some in which, in spite of everything, amputation does not succeed in checking the spread of the disease.

The absolute contra-indications to operation are, therefore, reduced to one—the inevitable recurrence of gangrene in the stump in certain cases.

(1.) Thrombosis limited to the capillaries.

Here the line of treatment will depend upon the condition of the tibial arteries. If these are fairly healthy and their pulsation well marked, the process will tend to limit itself to the toes; a line of demarcation will form, and finally, after months of suffering, the dead portions will separate. Septic absorption is the exception, owing to the barrier which the line of demarcation affords; and though sometimes the patient dies worn out by pain and exhaustion, on the whole the prognosis as far as life is concerned is good. Amputation, therefore, is not imperatively called for, and is only justified on the ground of saving time and suffering, and substituting a sound well-formed stump for one which, although Nature occasionally performs her task remarkably well, is likely to be ill-shaped, and to possess a tendency to take on unhealthy action on the slightest provocation.

Should an operation appear advisable, the questions when and where have still to be answered.

The process as sketched above is essentially chronic, and constitutional disturbance slight and likely to remain so; therefore there is no hurry, and advantage should be taken of this circumstance to prepare the patient. It is limited to the toes, the large arteries are fairly healthy, and amputation may therefore be performed in the lower part of the leg.

(2.) Capillary thrombosis extending to the larger vessels.

It is, of course, impossible to say at the onset whether the thrombosis will extend or not, and though extreme calcification of the larger vessels together with a feeble pulse suggests the probability of such a course, it would be unwise not to take advantage of the doubt, and spend the time in improving the

patient's constitutional state as much as possible. Should, however, a pulse at first easily felt, later becoming feeble, and finally imperceptible, show what is in progress, and the gangrene commence spreading to the foot, no time should be lost.

If left to itself, the process will spread either continuously without any line of demarcation forming, or intermittently, line after line forming, only to be again passed as thrombosis extends upwards. Septic absorption is almost inevitable, and as a rule comes on suddenly and without warning, an unexpected rigor showing that the favourable moment for interference has been allowed to pass.

A few cases terminate in spontaneous amputation, but not sufficient to render the statement invalid, that amputation, far from being a mere matter of convenience, as in the foregoing, is urgently required. It should be done as soon as the gangrenous process begins to spread, as waiting for the patient's general condition to improve is often to wait in vain. And since the vessels are much diseased, the limb should be removed just below or just above the knee.

(3.) Primary arterial obstruction.

Should the signs and symptoms point to obstruction of one of the larger vessels, treatment on the lines recommended above may set up the collateral circulation, and thus avert the impending gangrene. But the result may be less happy; the collateral circulation may become efficient, but not before one or two of the toes, or one or more patches of skin on the foot, have gone too far for recovery, and salvation comes too late; or, and this is the commonest result, the circulation fails to return, and the limb perishes *en masse*.

What shall be done in these two cases? In the latter, the procedure, I think, is pretty clear. If the obstruction is in the superficial femoral, and gangrene extends nearly to the knee, amputation must be done through the thigh, at the junction of the middle with the lower third. If the tibial is the seat of obstruction, mortification will in all probability affect the foot only, and the limb may therefore be removed through the lower third of the leg. The only question to be settled is, When shall the operation be done, since the large amount of tissue involved renders removal other than by means of the knife impossible? Little advantage can be gained by delay when gangrene is once definitely established. True, it may be said that an attempt should be made to improve the patient's general condition; but is any improvement likely to take place whilst he is harassed by the pain and inflammation which the presence of the dead

tissues excites? Rather is he likely gradually to go downhill, to-day finding him a little weaker, a little more drowsy, with less appetite than yesterday, till one day a decided change for the worse, a raised temperature, with rigors, a running pulse, diarrhœa, muttering delirium, &c., indicate only too plainly that all hope of improvement is at an end, and the limb is removed as a last resource, but with little hope of averting death, which only too surely follows. In the belief, therefore, that waiting for improvement is only a snare and delusion in many cases, I would recommend amputation as soon as the part is seen to be clearly dead.

In the former, where the circulation is partially restored, the difficulties in coming to a decision are great. If gangrene rapidly and distinctly becomes limited to a toe or a patch of skin, the case is exactly parallel with one of capillary thrombosis, and may be treated in the same way; but if the deeper tissues are affected, and scattered abscesses form in the sole of the foot or in the muscles of the calf, as the result of sloughing in these regions, I believe that the interests of the patient will be best consulted by adopting the same treatment as that recommended above, where the collateral circulation is not restored at all.

(4.) Inflammatory.

This is an extremely fatal form, whether of the traumatic or idiopathic variety.

In the former the tissues already almost dead have succumbed to a trivial injury, and the chance of their surviving the extensive damage which an operation necessarily inflicts is small indeed, gangrene recurring with almost absolute certainty in the flaps. Amputation is therefore out of the question, not because it holds out less chance of recovery than palliative measures, for under either circumstance the case is hopeless, but because it entails additional and useless suffering.

In the latter, when diabetes is the constitutional cause of the local death, the case is on identically the same footing as those of traumatic origin. It should be borne in mind, however, that senile gangrene of any sort may be complicated by glycosuria, and the mere presence of sugar in the urine must not be taken as a contra-indication to operation without further careful investigation; indeed, in some cases this entirely disappears after the removal of the mortified parts.

On theoretical grounds, therefore, it might be considered probable that amputation would not only succeed in removing the gangrenous parts, but also exert a favourable influence on the course of the diabetes which caused their death; but this has not been borne out in practice.

Further experience may place the matter in a new light, and it may be found that in inflammatory gangrene, either of traumatic or diabetic origin, to quote again the words of James, "higher in the limb the powers of the part may be equal to the repair of a large wound, although below they are incapable of throwing off a slough."

Objections may be raised to the inclusion of diabetic cases under senile gangrene, and doubtless many cases are better regarded as diabetic gangrene occurring in elderly subjects, but in some the two predisposing causes act together, senile decay rather than diabetic malnutrition appearing to determine the onset of the disease.

Other cases of inflammatory gangrene occur in tabetic subjects, starting from a perforating ulcer, and, as already stated, in some gouty patients, or those whose constitutions have been broken down by high living, inflammatory changes complicate capillary or arterial thrombosis. In these, however, the treatment required will, as a rule, be that described under those heads, although it must be recognised that such a complication renders the prognosis less favourable.

On looking over the Hospital records for the last ten years, although in some instances the notes have left it rather uncertain into what class the case should go, I have collected thirty-seven cases of senile gangrene, exclusive of those in which diabetes was noted as present, and which I have placed in a separate list, which I believe may fairly be arranged as follows:—

All occurred between the ages of fifty and seventy-five, with one exception, viz., a man aged forty-eight, with advanced arterial disease.

Twenty-four were males, thirteen females.

(1.) Capillary thrombosis, 15.

12 treated without operation.

9 recovered.

1 died.

2 discharged in *statu quo*.

3 treated by amputation, and all recovered.

1 lower third of leg.¹

1 upper third of leg.²

1 Syme.

¹ Glycosuria complicated this case, and was rendered worse by the operation, but subsequently cleared up.

² Toes only affected, but arteries very calcareous.

- (2.) Capillary thrombosis spreading to the larger vessels, 7.
 4 treated without amputation.
 3 died.
 1 self-discharged, worse than on admission.
 3 treated by amputation, and all recovered.
 2 upper third of leg.
 1 through the metatarsus.
- (3.) Obstruction to main artery, 11.
 6 treated without operation, and all died.
 3 treated by amputation, and all died.
 2 lower third of thigh.¹
 1 lower third of leg.²
 1 moribund on admission.
 1 collateral circulation established, recovery with loss of little toe only.
- (4.) Inflammatory, 2.
 1 traumatic died.
 1 tabetic recovered.

Two other cases of a mixed nature occurred, but from the records it is impossible to assign them to their proper division.

Diabetic, 14.

- 9 treated without amputation, and all died.
 5 treated by amputation, and all died.
 2 through the thigh.
 2 through the leg.
 1 Syme.

Of the fourteen diabetic cases, ten were males, four females. Only three were below fifty, the others ranging from fifty-four to seventy-nine; and in six the arteries were diseased.

The latter facts may perhaps justify the inclusion of some of these cases under the heading of senile gangrene, since they show the important share taken by old age in the causation of the disease.

But whether justifiable or not, I shall be content if I have made it clear that as long as amputation is advised or condemned, and cases for or against are quoted, under so comprehensive a term as senile gangrene, without more accurate reference to the particular cause at work, so long must our ideas be false and our practice erroneous.

For permission to publish the above cases my best thanks are due to the surgeons under whose care they were admitted.

¹ In one of these, amputation was done eighteen days after onset of gangrene, when the patient was suffering from septic absorption with rigors and high temperature. In the other, a slough formed on the flap, and patient died eleven days after operation of asthenia.

² Tibials plugged at site of operation; parts noticed to be very bloodless; gangrene recurred in flaps.

THE GREAT OMENTUM:

NOTES ON ITS DEVELOPMENT, ANATOMY, PHYSIOLOGY, AND PATHOLOGY.

BY

W. McADAM ECCLES.

The peculiar fold or apron of peritoneum, apparently springing from the lower border of the stomach, and lying in front of the small intestines, is called the great omentum, or the gastro-colic omentum.

Of recent years it has been the subject of some close study with regard to its development, and has become of especial interest to the practical surgeon. There is, however, still some uncertainty as to its exact mode of origin, and a considerable lack of evidence as to its precise functions.

It will be my endeavour in the following paper to review our present knowledge concerning this part of the serous membrane under the following four headings: Development, Anatomy, Physiology, and Pathology.

I. THE DEVELOPMENT OF THE GREAT OMENTUM.

Many difficulties arise in connection with the investigation of the formation of the various folds of the peritoneum, which, as examined in the adult human subject, appear very intricate.

Two methods of observation are at our disposal: (*a.*) the examination of sections and dissections of embryos and foetuses in different stages of development; (*b.*) the inspection of the condition of the peritoneum as found in the fully developed state of the lower vertebrates.

In order to arrive at a right conclusion as to the steps by which the adult great omentum has been formed, it is very necessary to bear in mind the primitive disposition of the

alimentary tract and its supporting fold. In some of the earliest sections of the human embryo the intestine will be found to be a simple straight tube lying in the median line, and connected to the dorsal parietes by a simple continuous fold of peritoneum constituting the mesentery.

Very soon, however, the elementary straight intestinal canal grows in length, and of necessity becomes convoluted, and at the same time differentiated into the several parts which it later presents.

Such a simple, or at the most but slightly elaborated, condition persists throughout life in the amphibians, as for example the salamander, and even in higher vertebrates as the wombat.

What is therefore observable in the human foetus is the adult condition found in certain animals.

As the question under review here is that of the formation of the great omentum alone, it is unnecessary to enter into further and fuller details with regard to other parts of the peritoneum.

The stomach, which was originally placed vertically and in the median line, as it becomes more and more enlarged has a great tendency to take a position which is oblique, or even horizontal, and at the same time to fall over to the right of the spine, thus bringing its left-hand surface to look ventralwards, and its right-hand surface dorsalwards.

Now it is before the stomach has assumed this its final position that the first appearances of the great omentum will be seen, a fact which it is very important to remember.

Divergence of opinion will here be met with, and is probably due to the great difficulties which beset the way to an exact knowledge of the development of the gastro-colic omentum.

Professor Cleland,¹ in the year 1869, thus expresses himself: "The stomach turns over on its right side and assumes its subsequent form, the mesogastrium grows still more redundantly, and forms the pendulous omentum, while the free edge of the gastro-hepatic omentum does not grow proportionately, but remains as the anterior limit of the foramen of Winslow."

This extract is indefinite, and but little tends to put the early appearance of the omentum on a clear basis.

Cruveilhier,² in 1865, had advanced a more distinct statement, but I think a somewhat erroneous one. He says: "La portion de ce mésentère qui répond à la dilatation stomacale, peut être désignée sous le nom de *mésogastre*. Formé de deux

¹ Jour. Anat. and Phys., 1869, vol. iv. p. 198.

² Anat. Descrip., 4e edit. tom. ii. p. 537.

lames, dont l'une regarde à droite, l'autre à gauche, le mésogastre est fixé au bord postérieur de l'estomac, qui deviendra plus tard la grande courbure de cet organe.

"Longue celui-ci, de vertical qu'il était, se rapproche de la direction horizontale, le mésogastre, qui est obligé de suivre ce mouvement, devient horizontal lui-même et représente alors une cloison transversale, dont un des feuilletts regarde en haut et l'autre en bas. . . . Mais, dans la suite, il s'allonge considérablement, et, pour se prêter à l'espace étroit qu'il occupe, il forme un pli, qui descend vers la cavité du bassin. Ce pli n'est autre chose que le grand épiploën."

In support of the above statements Cruveilhier gives two diagrams, proving without any doubt the exact meaning of his description.

Mr. Lockwood,¹ in 1884, following the above author, says: "The mesogastrium extends from the spine to the greater curvature of the stomach, and continuing to grow in a disproportionate manner, it forms a fold. This fold of the mesogastrium consists of two layers of peritoneum; it loops downwards from the stomach towards the lower part of the abdomen, it then ascends to the spine. In fact, the mesogastrium has become the great omentum." Mr. Lockwood makes use of Cruveilhier's diagrams. If the above could be accepted in its entirety, it would afford a simple explanation of the first appearance and subsequent development of the great omentum; but unfortunately it can hardly be considered to be in all respects a true account of what takes place.

In Cruveilhier's description given above, he very clearly says that when the stomach assumes its nearly horizontal position the mesogaster has necessarily to follow this movement of its enclosed viscus and itself to become horizontal, so that it presents an upper and a lower surface. A little closer examination into what really happens during this movement will, I think, show that it is by no means necessary that the mesogaster should become horizontal, or, as it is perhaps more correct to say, transverse.

The horizontal position of the stomach is not gained by what may be termed a *lateral flexion* of the organ, but by its pyloric end rising to nearly the same level as the cardiac end on an axis which is from before backwards. In other words, it is easy and rational to conceive of the above change without any tendency for the mesogaster to become horizontal, and, in fact, it does not become so.

¹ Jour. Anat. and Phys., 1884, p. 257. See also, however, Mr. Lockwood's description of the same in his Lectures on "The Morbid Anatomy, &c., of Hernia," p. 88.

This upward tendency of the pylorus is quite natural during the growth in length of the intestinal tract, but the change does not take place for some time after the stomach has turned over to the right.

It is therefore impossible, it would seem, to hold that the great omentum is the outcome of a pouching downwards (or caudalwards) of a horizontal (or transverse) mesogastrium.

If this view must be rejected, what other will take its place?

The lower mammals in some instances, as, for example, the two-toed ant-eater,¹ present an entirely different conception of the primitive condition of the great omentum.

Here it will be seen to be a pouching of the original longitudinal fold of peritoneum passing from the stomach to the dorsal parietes; but this bulging is towards the *left*, and only slightly downwards.

A like commencement probably holds good for the human embryo at about the tenth week of intrauterine life, or even earlier.

The rotation of the stomach over towards the right will naturally bring the laterally projecting pouch to appear to look in a *forward* and downward direction, and to later easily cover the anterior surface of the small intestine and transverse colon.

As the early representative of the great omentum is formed by the lateral bulging of the double layer of the mesogastrium, it is obvious that both the subsequent anterior and posterior layers of the great omentum are composed of two layers of peritoneum.

A careful examination of the early stages will show that this projection only takes place in that portion of the mesogaster which extends from about the middle of the greater curvature of the stomach to the region of the pylorus. The opening of the pouch subsequently becomes the foramen of Winslow.

As to the cause of this remarkable bulging into a bag-like pouch we are entirely in the dark.

The subsequent relationship of the layers of the great omentum to the transverse colon is excellently discussed by Mr. Lockwood in the paper quoted above, and no reference will be made to it here.

2. THE ANATOMY OF THE GREAT OMENTUM.

In the brief survey of the process of the development of the great omentum it has been noticed that this structure is com-

¹ Treves in Morris's "Treatise on Anatomy," p. 1039.

posed of four layers of peritoneum, two being, in the upright position, anterior, and two posterior, the latter having between them the transverse colon, and thus forming the transverse mesocolon.

Enclosed between the double anterior and posterior folds is part of a space known as the lesser sac of the peritoneum, communicating with the greater sac by means of the foramen of Winslow.

In the foetus the cavity of the lesser sac can be easily traced down into the dependent fold of the great omentum, but in the adult all four folds are usually completely welded together, so that the lesser sac becomes much reduced in extent.

It is an interesting fact that the great omentum is found in all the mammalia, and in many of the lower vertebrates.

In the newly-born child at full term it will be seen to be relatively much shorter than in the adult, thus showing that there is growth in the omentum after birth out of proportion to the actual growth in length of the body. Moreover, there is a tendency for the omentum to become longer, and therefore to hang lower on the left side than on the right, possibly as an outcome of its having commenced chiefly as a left lateral pouching of the mesogastrium.

As to the normal situation of the epiploön with reference to the small intestine, it is scarcely needful to say that the usual description of it as lying as an apron in front of the coils is frequently more diagrammatic than is actually the case.

Indeed, its relationship to the intestines and other viscera of the abdominal cavity varies very greatly in different subjects. In thirty-seven out of eighty-nine subjects I have examined,¹ the great omentum completely hid from view the small intestines when the abdominal walls were opened. This will be seen to be about 33 per cent.

All these were cases in which there was no apparent disease or abnormality of the great omentum or other part of the peritoneum.

Thus the great omentum may be said to be placed behind that part of the anterior abdominal wall which is unprotected by bone or a thick layer of muscular tissue.

In the bodies where the omentum was situated as above described, the greater bulk of it lay below the level of the umbilicus.

The actual length of the fold varies greatly; the extreme

¹ It must be remembered, however, that the position thus observed is that in which the great omentum was found *after death*. The cause of death may have perhaps a marked influence upon the relationships of the omentum.

limits which I have found, measuring from the lower border of the transverse colon, have been 3 inches to 13½ inches.

Mr. Lockwood's observations¹ as to the extent to which the epiploön could be drawn down are of much interest and importance.

He found that in twenty cases under the age of forty-five years only one had the omentum long enough to project beyond the spine of the os pubis, and in only five others could it be brought down to the top of the symphysis pubis. After forty-five years of age it was the exception rather than the rule to find an omentum which could not be pulled beyond the lower limits of the abdomen.

What I have observed fully bears out the above statements.²

Various other positions may be assumed by the great omentum than that of lying evenly spread out so as to conceal the whole of the coils of the small intestine.

Out of the fifty-two cases not accounted for above, in the larger number the small intestine was to a greater or less extent exposed, chiefly at the sides, but also below.

In two cases, when the abdomen was opened, *nothing* of the omentum could be seen in its ordinary position, the small intestine being entirely uncovered.

In the first case, that of an old man of seventy-three, who died after fracture of ribs with subsequent left empyema, the organ, which contained an average amount of fat, was turned upwards, and tucked away between the under surface of the diaphragm and the upper surface of the right lobe of the liver. How this condition occurred it is impossible to be certain, but the fact that the patient, having a considerable amount of dyspnœa, was in a sitting or semi-reclining posture for nearly a fortnight before death may be taken as a possible cause. There were no adhesions anywhere, and the omentum could be readily pulled into its normal position.

In the second case the great omentum was rolled into a mass—easily unravelled, however, for there were no adhesions—and hidden from view, lying above the small intestines in front of the duodenum.

There was no apparent reason for this; but the position is worthy of notice for its bearing on some points in pathology, and probably the condition is not a very uncommon one when disease is present, but this is the only instance of it which I have seen where the omentum was healthy.

¹ *Op. cit.*

² See also an interesting table of twenty cases by Dr. Kenneth M'Leod. *Edin. Med. Journ.*, vol. xxiii. 1877, p. 23.

The actual position of the epiploön in the abdominal cavity is of course dependent upon a number of outside circumstances, such, for instance, as the dilatation of the stomach or transverse colon leading to shortening; the condition of the small intestines, distension pushing it upwards; the size of the liver, an enlargement producing a downward displacement; the age of the patient, as has been pointed out above; and whether there is any abnormal condition present within the abdomen, *e.g.*, ascites, ovarian and other tumours.

The lower margin of the fold is often said to be crenated or fimbriated, and this, I take it, is the usual form.

Its anterior surface is smooth, and moves with but little friction on the parietal peritoneum. The posterior surface is probably irregular, since the omentum fits into all the inequalities of the viscera against which it lies.

The thickness varies greatly, but is dependent chiefly upon the amount of adipose tissue it contains.

It may be excessively thin and transparent, especially in the young and emaciated: as age advances the tendency is towards a greater deposition of fat.

The arteries, which are large and numerous, and derived from the gastro-epiploic vessels, form very long loops with the veins which pour their blood into the right and left gastro-epiploic veins, the former being a tributary of the superior mesenteric vein, the latter of the splenic vein.

The nerves passing to the great omentum are branches derived from the solar plexus through the splenic and hepatic plexuses, and are distributed with the arterial branches.

Along the greater curvature of the stomach, and between the two anterior layers of the great omentum, lie some six or eight inferior gastro-epiploic lymphatic glands. These receive lymph from the inferior gastric lymphatics and the omental lymphatics, and discharge their lymph into the coeliac glands by vessels which pass between the pylorus and the pancreas.

3. THE PHYSIOLOGY OF THE GREAT OMENTUM.

Under this heading it is proposed to discuss the functions of the omentum. A good deal of uncertainty exists, again, as to the exact uses of this fold of peritoneum, but some may at least be surmised.

It is well, I think, to divide these supposed, or perhaps real, uses into two classes: (*a.*) those which may be termed the normal or true physiological functions, and (*b.*) those which the omentum performs when some pathological condition is present,

or what may perhaps, for want of a better expression, be termed its abnormal uses.

(a.) *The normal physiological functions of the great omentum.*

Most if not all of the following propositions as to the part played by the omentum in the economy of the human subject will probably be allowed to have some weight.

(i.) It serves as a protection to the intestines, possibly from external violence. This will appear more evident the thicker the omentum is.

(ii.) It acts as a heat-retaining covering to the viscera which lie behind it.

(iii.) It is a place where excess of adipose tissue can be temporarily or permanently deposited.

(iv.) The large surface which the great omentum presents, and the fact that it is so well provided with blood-vessels and lymphatics, constitutes it particularly well fitted for absorption of fluids.

(v.) It will allow of the more easy distension of the stomach and transverse colon, the former by recently received food, and the latter by fæces. Cruveilhier says: "Lorsque l'estomac et le colon sont extrêmement distendus, l'épiploon est réduit à une zone ou bordure plus ou moins étroite, qui longe l'arc du colon."¹

(vi.) Moreover, the intestines, owing to great changes in the amount of their contents, liquid, gaseous, or solid, and to their movements, must be constantly presenting very marked variations in their general surface form, and it is possible, nay, probable, that the omentum acts as a yielding surface fitting into the many irregularities to which its posterior aspect is presented. It is true that in the normal condition of the parts there is no real peritoneal space or cavity, and to maintain this state the omentum may be of service. In connection with this point it is important to remember that the omentum is in its more highly developed character found in the mammalia, and is therefore necessarily associated with a diaphragm. This muscular partition in its incessant movements during respiration is intermittently to some degree compressing the abdominal viscera, and it is possible that there may be some connection between these movements and the more pronounced development of the omentum.

(vii.) It is well known that the veins of the abdomen are capable of holding a very large proportion of the blood of the body, and they are said to become distended in cases of shock.

The veins of the omentum are considerable in their sectional area, and may be seen much dilated in cases of portal obstruction.

¹ *Op. cit.*, p. 534.

tion. It is probable that during digestion, especially that which takes place within the stomach, all the vessels of the mesogastrium are dilated, and consequently a very free blood-supply is given to the active organs.

Moreover, this increase in the amount of blood will also produce an increase in the amount of heat, which in itself may act as an assistance to rapid and thorough digestion, both in the stomach and in the small intestines covered by the great omentum.¹

(b.) *The abnormal uses of the great omentum.*

As has been stated, by this term "abnormal," it is intended to designate those uses of the great omentum which are in association with some abnormal or pathological condition.

(i.) The lower edge or border of the epiploön, as mentioned above, is usually scoloped, crenated, or fimbriated, though the extent of this peculiarity varies much in different subjects.

To this series of what may be termed "perpetual feelers" there seems to be allotted an important function.

Whenever any pathological condition of the abdominal viscera arises with a liability to local peritonitis, there appears usually to be a tendency for the great omentum, and particularly its lower border, to approach, if we may so say, the seat of inflammation, and to become adherent to the diseased spot.

There are numerous instances on record how this organ has, so to speak, sealed up perforating ulcers of the intestine, or has added an extra resisting wall to the exterior of an ulcer or abscess which was threatening to break into the peritoneal cavity.

I have seen several instances in both the living and dead subject of this conservative use of the omentum, particularly in reference to cases of diseased appendages in the female, and of appendicitis. Travers² found intestinal wounds in dogs frequently closed by omentum, fæcal extravasation having been thus prevented.

Jobert gives a very remarkable case, where a young man was run over the abdomen, but had no subsequent symptoms pointing to injury of any of the viscera. He died suddenly from hæmoptysis two months after the accident, and on post-mortem examination a partial rupture of the small intestine was discovered which had been occluded by a plug of omentum projecting for half an inch into the gut.³

In this connection may be mentioned the now recognised use

¹ See an interesting paper by Hennecke, "*De functionibus omentorum*," 1836.

² Travers, "*Process of Nature in Repairing Injuries of the Intestines*."

³ See also Gross, "*System of Surgery*," 5th edit. p. 664.

of omental grafts after suture of wounds of the stomach and intestines, and for covering large ovariectomy and hysterectomy stumps.

Senn¹ remarks, in connection with this subject: "In almost all post-mortem examinations of specimens from operations on the intestine, I have observed that the omentum was adherent over a greater or less surface at the seat of suturing." In anticipating nature, Senn at first used omental flaps, but later found omental grafts did equally as well.

(ii.) Another and somewhat similar use of the omentum is that of preventing the protrusion of viscera, especially of small intestine, in the case of some penetrating wounds of the abdomen.

This is brought about in either of two ways: firstly, the omentum itself protrudes in a greater or less degree, and so plugs the wound, rendering it incapable of allowing intestine to become herniated; or, secondly, a thick omentum, even if not projecting into the wound itself, may effectually prevent the protrusion of any viscus behind it.

The occurrence of both of these conditions is of course dependent upon the seat of the wound and the position of the omentum within the abdomen. It is a remarkable fact that lesions of this description but rarely prove fatal, showing, I think, a real and applicable use of omentum under such circumstances.

A case of Baron Larrey's is recorded by Guthrie² in which an omental protrusion restrained hæmorrhage from the deep epigastric artery.

(iii.) Yet another, but a minor and probably much less frequent, use of the omentum may be mentioned. I refer to the protection which is offered by it to the intestine in an entero-epiplocele, especially when strangulation occurs.

Reference to this point will be made again later.

4. THE PATHOLOGY OF THE GREAT OMENTUM.

Many may perhaps not be able to agree with much which has already been referred to, and may, moreover, fail to see any utility in it, but a thoroughly practical division of the subject has now been reached.

The development of the omentum may be obscure, its anatomy given to much variation, and its functions uncertain, yet its pathological conditions are numerous and well-marked, as well as highly interesting and important. Even before birth

¹ Senn, "Intestinal Surgery," p. 172.

² Guthrie, "Wounds and Injuries of the Abdomen," p. 12.

the great omentum, in common with other parts of the peritoneum, may be the seat of disease.

It is a well-established fact that foetal peritonitis occurs, and while it usually involves the peritoneal membrane as a whole, yet its effect on the still but partially developed great omentum is worthy of notice. An inflammation of this kind may be caused by the exposure of the pregnant woman to cold and wet, but apparently most often occurs when she is the subject of gonorrhœa or syphilis.¹

This peritonitis may lead to adhesions within the abdomen, which may be afterwards the seat of internal strangulation in infancy, or to adhesions within a congenital hernial sac, especially those of umbilical ruptures.

A very good example of such an adhesion is recorded by Wrisberg.² A male child was born at the beginning of the eighth month. The right testicle had descended into the scrotum, but the left was arrested just without the external ring.

The child died a few days after birth. At the post-mortem examination, on opening the abdomen, the great omentum was seen to be drawn down into the left iliac region, and was united by three threads of adhesion to the tunica albuginea of the left testicle, "*tribus filis albugineæ testiculi accretum.*"

When the omentum was pulled upwards the testicle was raised coincidently.

This is an example of one of the many ways in which incomplete descent of the testis may be brought about.

Congenital diaphragmatic herniæ have been found with omentum passing through them.

In considering the various injuries and diseases to which the omentum is liable after birth, I shall perforce deal chiefly with the surgical aspects of the question, though allusion will be made to the very interesting diseases which are usually considered to be purely of a medical character.

i. INJURIES OF THE GREAT OMENTUM.

The omentum may be injured by external violence applied to the abdominal walls or to a hernial sac.

The lesions thus produced may be either subcutaneous, or a wound of the abdominal wall having been caused, omentum may be protruded injured already, or damaged after such protrusion.

¹ Simpson, Edin. Med. and Surg. Journ., vol. I. "On Foetal Peritonitis."

² Wrisberg, "*Commentarii Medici*," p. 229.

Subcutaneous lesions will here be noticed; wounds with herniation will be referred to under "Displacements of the Organ."

When the abdominal walls are subjected to blows from without, and especially in the so-called "buffer" accidents, it is easy to understand that if the omentum be lying in its usual position it will be exposed to injury.

Tears or splits more or less extensive have been found either post-mortem or on laparotomy for abdominal contusions.

Such injuries may be associated with laceration of other viscera, or may occur alone.

They are very liable to be attended with grave shock, even when no loss of blood of any moment occurs. This is probably due to the large supply of sympathetic nerves, and to the proximity of the solar plexus. Commonly severe hæmorrhage occurs, sometimes into the lesser sac of the peritoneum, where it may give rise to a well-marked swelling, which can be easily palpated.¹

In other cases the laceration has caused a part of the omentum to have its blood-supply cut off, with the result that gangrene has supervened.

An interesting case of this kind is given by Dr. Pitt,² in which a drunken man fell under a horse, and sustained a fractured clavicle, and complained of abdominal pain. Afterwards three days' vomiting ensued, and on the tenth day, while defæcating, he became suddenly collapsed, dying three hours later.

On post-mortem examination a slit was found in the lower part of the great omentum, causing a portion below it to become gangrenous, thus setting up fatal suppurative peritonitis. No laceration of any part of the intestinal tract was discovered.

The interest from a surgical point of view which attaches itself to these facts is the danger which division of omental adhesions in abdominal operations may produce in respect to the vitality of portions of the omentum. Several operations for resection of the pylorus have ended fatally from sloughing of surrounding tissues, including the great omentum.

It is certainly remarkable that an organ apparently so well supplied with blood should be liable to death after injury; but such being an undoubted fact, it has to be borne in mind when operating.

Omentum in a hernial sac is liable to be bruised or torn when taxis is roughly or improperly applied. Occasionally

¹ Brit. Med. Journal, 1859, vol. ii. p. 537.

² Ibid., 1889, vol. i. p. 893.

omentum has sloughed after it has been returned within the abdominal cavity, probably owing to laceration during the efforts made for its reduction, or its having been on the verge of gangrene before reduction.

There are cases on record in which foreign bodies have passed through the tissues and become embedded in the great omentum. A bullet¹ has thus become encysted, and in another instance a needle² two and a half inches long.

ii. DISPLACEMENTS OF THE GREAT OMENTUM.

Under this heading will be briefly reviewed the relationship which the great omentum bears to hernial protrusions. It will be well to discuss it under two headings.

(a.) The great omentum in connection with traumatic herniæ.

It has already been pointed out how the omentum may prevent herniation of abdominal viscera, but we now have to deal with the protrusion of omentum through wounds of the abdominal walls.

It is, of course, clear that some gaps made in the anterior wall of the abdomen are more likely to allow omental prolapse than others.

In analysing a large number of cases of penetrating wounds of the abdomen followed by projection of omentum, it becomes evident, as might have naturally been supposed, that the area which is most prone to be the seat of these herniæ is situated around the umbilicus, and chiefly below and to its left. In some cases of wounds of the diaphragm omentum has blocked the opening.

The amount of omentum which passes outside the abdominal wall varies much, and probably is determined by a number of circumstances of which the more important are the following:—The site, direction, and size of the wound, the position of the omentum within the abdomen, and somewhat the amount of exertion taken by the patient after the infliction of the wound.

The protrusion usually takes place directly after the wound is made.

The omentum which is protruded may or may not be injured. Other viscera may become prolapsed at the same time, or may be dragged down by the cord-like process of omentum.

The symptoms produced by the hernia may be very few, or even none at all. Vomiting, with pain, is perhaps the most

¹ New York Med. Journ., 1860, p. 246.

² Trans. Path. Soc., 1859, p. 93.

commonly present, and especially so if there be any dragging on the stomach.

The protruded mass is quite insensitive.

The prognosis of cases of traumatic hernia of the omentum is generally good unless some other injury complicate it: this is even so when no surgical treatment is adopted.

After the protrusion has occurred, adhesions very rapidly form between the edges of the wound and the neck of the projecting portion. This neck at the same time becomes more or less strangulated by the abdominal wall, with the result that the part beyond not infrequently wholly or partially sloughs.

If, however, the constriction be so slight as not to destroy vitality, plastic inflammation occurs, whereby the mass becomes what has not at all inaptly been likened to pancreatic tissue; granulations appear on the surface, and the tumour gradually dwindles away, the wound cicatrising and contracting, with subsequent permanent recovery of the patient beyond an adherent omentum.

This satisfactory result is probably brought about by the rapid formation of adhesions, whereby the general peritoneal cavity is shut off, and so acute septic peritonitis but rarely follows.

The treatment of such uncomplicated cases of omental protrusion is generally very simple and clear.

If the patient be seen soon after the injury, the omentum will be but little if at all congested. It will then be best—even if it be uninjured, and still more so if injured—to draw the omentum out a little farther, and to transfix and ligature a perfectly healthy portion and cut away the distal mass.

The stump and wound having been thoroughly cleansed with a warm antiseptic solution, the stump is to be returned to the abdomen, and the wound closed by carefully inserted silk or silk-worm gut sutures.

If, on the other hand, the case is seen some time after the accident, when the omentum is congested, inflamed, suppurating, or even gangrenous, the treatment will lie between removal of the mass by the ligature or the knife, or of leaving it alone, adhesions having been formed at the neck.

The protruding mass is certainly better removed in the earlier conditions by ligature or the scalpel, tying any vessels that may bleed.

The abdominal wound may be allowed to granulate.

(b.) The great omentum in relation to acquired non-traumatic herniæ.

The ileum and omentum seem to vie with the rest of the

abdominal viscera, and often indeed with each other, as to the privilege of being contained in a hernial sac. The situation of the omentum in front of the abdomen, between the parietes and the most movable part of the alimentary tract, accounts for its being frequently protruded in ruptures. Probably omentum is found in over one-third of all cases of abdominal herniæ. Thus it becomes of great importance in connection with ruptures.

Umbilical protrusions, on the whole, most constantly contain omentum; then inguinal, more particularly on the left side, and after that femoral; and again more frequently left than right femoral. This greater frequency of occurrence on the left side is explained by development, and the omentum hanging lower on that side.

As to age, it may be roughly said that omentum is much more likely to be present in old herniæ of old people, but it must be clearly understood that it is by no means infrequently protruded in recent herniæ in young subjects, and even indeed sometimes in children and infants.

Arnaud, in the last century, went so far as to say that omental herniæ did not occur before puberty, asserting that the great omentum was not found in the foetus or in tender infancy.

This, however, is clearly an error, even though stated by such a close observer.

Omental hernia or epiploceles are often only quite small in size, and when larger but rarely attain more than moderate dimensions, never reaching the enormous protrusions of entero-celes or entero-epiploceles.

A reducible omental hernia is usually easily recognisable. The tumour is soft and of a doughy consistence, and at the same time compressible. The surface is uneven, and, if the omentum is hardened, may be nodular.

There is no tension or elasticity about the rupture. It is elongated and pyriform, and but rarely rounded. It can be handled freely without causing pain unless rather severe pressure against the ring be applied. Often a careful examination reveals that parts of the swelling are softer in consistence than others.

On reduction, it usually passes back into the abdominal cavity more gradually than intestine, and without a gurgle.

When omentum lies in a hernial sac, although it may be everywhere non-adherent, yet it may offer a decided bar to easy reduction on account of its tendency, so to speak, to crowd up in the canal, and hang about the internal ring.

In applying taxis, therefore, to such herniæ, it is well to

thoroughly draw down the contents of the sac first, and then, by placing the fingers and thumb of the left hand (or right, as the case may be), or the thumbs of both hands at the upper part or neck of the sac, prevent the mass of omentum from overlapping the margins of the ring in folds. Lifting the sac at right angles to the abdomen may sometimes help reduction, but the zigzag or side-to-side movement recommended by some is of but little value.¹

Omentum is very prone to become adherent to the walls of the sac, to other parts of itself, or to intestine within the sac.

Either one of these varieties of adhesions may produce simple irreducibility, or may become a band which may cause strangulation of some of the intestinal contents of the sac.

Adhesions about the neck of the sac in a pure epiplocele may lead to the complete shutting off of the cavity of the sac from the abdominal cavity. This may give rise to the absence of an expansile impulse on cough, and may lead to the collection of fluid within the sac—hydrocele of the sac. An ordinary pure epiplocele does give rise to an expansile impulse when the patient coughs. This is probably due to three causes—(1) descent of more omentum suddenly; (2) sudden turgescence of the omental blood-vessels; and (3) the increase in tension in the sac which is always caused by any action of the abdominal muscles.

Of course it must be remembered that the expansion is not nearly so well marked as in an enterocoele.

The omentum contained in a hernial protrusion may remain unchanged in its anatomical characters, but not at all infrequently it undergoes very marked alterations. The pressure of the opening consolidates the omentum which occupies the ring, converting it into a smooth, round, firm mass. The bulk of it below the neck may become matted together into a mass, which will then be irreducible. This is brought about by adhesions, and also by the chronic congestion which is so common leading to a fibroid change.

In many instances, especially in old people who are fat, there is a deposition of adipose tissue. Thin persons may sometimes be the subjects of similar deposit. This will in most cases lead to irreducibility. In other epiploceles fat may be absorbed, especially when the patient is put on low diet, and continuous pressure applied to the rupture. An irreducible omental hernia may often by these means be rendered a reducible one. Sometimes omentum becomes cystic, and in very rare cases may undergo calcification.

¹ Macready, "A Treatise on Ruptures," p. 191.

Occasionally it may be affected when lying in the sac by sarcoma, carcinoma, or tubercle.

I have seen two instances of the latter deposit, both cases having at the same time tubercle of the peritoneum within the abdomen, and also of the sac wall itself.

In some cases the omentum has been almost separated from that in the abdominal cavity by the pressure of a truss, and has given rise to the belief in the presence of three testicles.

Omentum most commonly retains its normal relation to the intestine in an entero-epiplocele—that is, it lies in front.

There is a strong probability that omentum is protruded first, and gut follows after, coming down behind the epiploön.

This fact should be taken advantage of in the method of reducing such herniæ, for the part which descended last—the intestine—should be reduced first. Thus pressure should be made primarily on the posterior part of the contents of the sac.

In some herniæ the relationship between intestine and omentum may be altered.

Thus the latter may get drawn up on one side of the bowel, especially in large long-standing herniæ.

A coil of intestine in other instances may pass through a rent in a thin part of the omentum, and so appear anterior to it. This passage occasionally leads to strangulation.

Lastly, the omentum may come, through adhesions or otherwise, to practically surround the intestine, thus producing what has been termed an omental or second sac within the one formed of parietal peritoneum.¹

We now pass to an extremely interesting question of what occurs when omentum becomes nipped at the neck of the sac. A considerable amount of dispute has risen as to whether the strangulation of omentum alone gives rise to the classical signs of “strangulation.”

Such signs or symptoms may be stated to be:—

(1.) Vomiting, of a characteristic persistent gushing nature, firstly of the contents of the stomach, then bile-stained, and lastly fæculent.

(2.) Constipation, which is usually absolute, neither fæces nor flatus passing per anum.

(3.) Tension of the swelling.

(4.) The hernia is not spontaneously reducible, and cannot be reduced by the patient's efforts.

(5.) There is no impulse on cough.

(6.) The swelling is larger than it was.

¹ Richter, *Traité des Hernies*, p. 133.

(7.) There is pain in the hernia, and often, moreover, pain referred either to the spine or the region of the navel.

(8.) Distension of the abdomen.

(9.) Prostration comes on with typical abdominal facies.

(10.) Diminution in the amount of urine, or even inability to micturate.

Before entering into the discussion whether any or all of these symptoms are found in cases of constricted omentum, I shall refer to the published statements of some of the most eminent authorities who deal with the subject.

Lawrence,¹ in his "Treatise on Ruptures," appears to make some rather contradictory remarks, in my opinion, but they are so instructive that I venture to give them word for word.

In speaking of the symptoms of a strangulated hernia in which gut is evidently nipped, he deals with the subject of complete constipation, or, as he calls it later on, "insuperable constipation," and towards the close inserts this remarkable sentence: "It (*i.e.*, complete constipation) even happens *occasionally* in a mere epiplocele, where no intestine is protruded." (All italics are mine.) A few pages later he says: "An epiplocele is much less liable to strangulation than an intestinal rupture, and its immediate symptoms are milder and slower in their progress. In this variety of the complaint, stools may *generally* be produced by purgative medicines or clysters.

"The *connection of the omentum with the stomach* induces hiccup and sickness, and although the latter symptom *seldom* proceeds to stercoraceous vomiting, it exists to a most distressing degree, and particularly characterises the complaint.

"The symptoms are often influenced by the position of the body, being mitigated by bending, and aggravated by straightening the trunk.

"An epiplocele is occasionally accompanied with all the dangerous and alarming symptoms of an intestinal rupture, as insuperable constipation and faecal vomiting."

Still later the following sentences occur: "An incarcerated epiplocele is the least dangerous, and indeed is seldom fatal. The sensibility of the omentum is not considerable in the natural state; it can bear much pressure without inconvenience, and it does not ordinarily excite alarming symptoms when inflamed."

The above quotations tend to show that "strangulated omentum," in the opinion of Lawrence, gives rise to symptoms which are more or less those of strangulation, but at the same time he makes use of expressions which seem to clearly indicate that

¹ "Ruptures," 5th edit. pp. 53, 57, 78, 448, 449, 454.

omentum may be nipped, and yet no "alarming symptoms" arise. Are the cases where these are present really purely omental?

Later in his invaluable treatise, Lawrence points out that "in a case which we have already diagnosed as an epiplocele, the symptoms of strangulation may be produced by the recent addition of *so small a piece of intestine as not to add to the apparent size of the tumour.*" This might almost be taken as an admission that a small knuckle of gut is generally the cause of the symptoms of strangulation. He further says: "A strangulated epiplocele is frequently presented to our notice with the tension and elasticity of an enterocele; these symptoms depending upon effusion of fluid into the sac."

He concludes with again making a very strong assertion as to the possibility of "strangulated omentum" giving rise to severe symptoms. "An omental rupture may experience such pressure at the moment of its formation as to cause acute pain in the part, extending to the abdomen, vomiting, constipation; in short, the symptoms of acute strangulation. . . . Often there is no distinction in the nature or severity of the symptoms between omental and intestinal ruptures, so that the most experienced surgeons have sometimes concluded wrongly from the violence of the disorder, particularly from the vomiting and constipation, that intestine must have descended in cases which they had formerly known to be simply omental ruptures."

When it is remembered, however, how difficult it is sometimes to be quite sure a sac contains only omentum, and that when the mouth of the sac is, as it were, kept open by a piece of omentum projecting into it, a portion of intestine may so easily slip by, it is most natural to conceive that intestine which is nipped is the real cause of the symptoms.

It is interesting to note that two authorities, Scarpa in his treatise, and Birkett in his article¹ on hernia, avoid any mention of "strangulated omentum."

Mr. Holmes, however, in his work² writes: "The strangulation even of omentum only produces symptoms identical in kind with those of strangulated bowel, though possibly not so severe, a fact which I find difficult to account for on purely mechanical principles, especially as the omentum when exposed in the operation for hernia is constantly tied tightly, in order to remove portions of it, with complete impunity." With regard to the effect of a ligature upon the omentum I shall allude presently.

¹ Holmes and Hulke, "A System of Surgery."

² Holmes, "Surgery: Its Principles and Practice," 2nd edit. p. 620.

More recently Mr. Macready¹ upholds the view of Mr. Holmes, although he mentions opposing statements: "A piece of omentum may be strangulated and accompanied by symptoms which cannot be distinguished from those of constricted intestine."

"It is generally admitted that the symptoms to which strangulated omentum gives rise are usually of less severity than when bowel is included"—the vomiting is less frequent, and less copious, and the bowels may act unless peritonitis comes on.

Again, Mr. W. H. Bennett² says: "It is a notorious clinical fact that strangulation of herniated omentum is generally associated with constipation of the most obstinate kind, and frequently with all the other symptoms of strangulation."

He gives the notes³ of a very interesting case, however, in which there were no symptoms of strangulation besides pain, and no true hernial impulse; and yet when he performed herniotomy, the sac was found to contain a large mass of omentum, congested throughout, at the back of which was a small area of commencing gangrene.

Lastly, I will quote on this side of the question Gosselin, who says: "Tout à coup la tumeur devient plus volumineuse; si elle était réductible, elle ne se réduit plus; elle devient chaude, douloureuse à la pression et pendant les mouvements. En même temps apparaissent quelques coliques; parfois, mais pas toujours, des nausées et quelques vomissements, dans un certain nombre de cas même la constipation."

I now turn to the statements of Mr. Rushton Parker,⁴ who is opposed to the view that nipping of omentum *per se* leads to symptoms of strangulation. "Strangulated omentum," he says, "can have no symptoms, and that in cases where signs of strangulation are present a loop of bowel has been strangulated, or some other cause of obstruction is present."

Mr. Paul Berger,⁵ in commenting on the statement of Gosselin given above, writes: "Telles sont la physionomie et la marche de ces accidents, et c'est un des principaux mérites de Maligne d'avoir prouvé et proclamé très haut qu'ils reconnaissent pour cause l'inflammation de la hernie et de l'épiploön qu'elle renferme, la peritonite herniaire et l'épiploïte, et qu'ils n'ont rien de commun avec l'étranglement, dont la condition formelle est la présence de l'intestin dans la hernie."

¹ Macready, "A Treatise on Ruptures," p. 349.

² Bennett, "Lectures on Abdominal Hernia," p. 12.

³ Op. cit., p. 2.

⁴ Parker, "Abdominal Hernia," p. 17. See also *Lancet*, 1876, vol. ii. p. 219.

⁵ Berger, "Traité de Chirurgie," tom. vi. p. 625.

While perhaps not agreeing with Berger that all the symptoms are due to inflammation of the omentum, it is clear that he does not consider mere nipping of omentum as sufficient to cause symptoms of strangulation.

Later he continues: "Les phénomènes des l'épiploïte ne sont jamais ceux des étranglements: les vomissements sont rare et ne prennent jamais le caractère fécaloïde.

"Presque toujours les malades émettent spontanément des gaz par l'anus; quand on a recours à l'action des purgatifs, ceux-ci prouvent aussitôt des évacuations. Nous passerons sur la localisation de la douleur au pédicule de la hernie, qui est la règle dans l'étranglement, qui fait défaut ou n'est pas plus marquée qu'ailleurs dans l'épiploïte, et sur la moindre tension qui caractérise cette dernière car ces caractères peuvent induire en erreur.

"Mais jamais l'inflammation d'une epiplocele ne détermine la réaction générale, les phénomènes nerveux, l'anxiété, l'état de dépression, d'hypothermie que présentent les sujets atteints d'étranglement intestinal.

"On a bien cité des cas où tous les phénomènes de l'étranglement avaient été observés pendant quelque temps et dans lesquels, à l'ouverture de la hernie on n'a trouvé que l'épiploön: mais comme il y avait eu toujours des efforts violents et prolongés de taxis et qu'il est même dit expressément dans un certain nombre de cas observations que la hernie avait diminué de volume après ces tentatives de réduction, il est probable que les apparences de l'entranquement étaient dues à ce qu'une petite anse d'intestine se trouvait comprise dans le hernie, que c'était elle qui avait été le siège des phénomènes d'incarcération, mais qu'elle avait été réduite et que l'épiploön seul était resté dans le sac."

I have quoted the above at such full length because it so entirely states my opinion on the subject, and what I have observed clinically.

Having thus given the views of several authors, it remains to be seen how the symptoms analogous to, or identical with, those of strangulation may be accounted for, when by operation omentum only is found in the sac. It will be seen that I here allow that such symptoms do occur in these conditions, but by no means always.

Firstly, then, I may repeat, I do not think them due to the mere nipping of omentum at the neck of the sac. My attention was first directed to the subject by a case which I saw when a dresser, where a young man with a recent hernia had all the ordinary symptoms of strangulation, and when the sac was

opened omentum only was found; congested but not gangrenous; in fact, a case similar to the one recorded by Mr. Bennet.

The symptoms were put down to the strangled omentum, and it was ligatured after being transfixed, and cut off, the stump being returned to the abdomen. All the symptoms of strangulation disappeared at once, and the patient made a good recovery.

Yet the case was a puzzle to me, and, like Mr. Holmes, I could not reconcile the intense strangulation by a ligature and cessation of symptoms, with the lesser nipping and their appearance.

Lawrence says:¹ "If strangulation of the omentum by the ring is sufficient to produce dangerous symptoms and mortal consequences, must they not be equally expected from that stricture which is caused by ligature?" And *a priori* one would think so; yet how many times has omentum these later years been ligatured with no ill results?

It must be admitted, however, that sometimes, but very rarely, symptoms such as vomiting, &c., do follow ommental ligature, but pass off quickly; in fact, Mr. Bennett² urges this as an argument in favour of pure epiploceles when strangulated producing symptoms.

These latter cases, however, are open to the explanation that other causes of vomiting, pain, &c., may be present, such as the effects of the anæsthetic, tension in the skin wound, &c.

Scarpa also considered that ligature of omentum was a highly dangerous proceeding, and likely to produce symptoms resembling those of strangulated bowel, for he advises that the omentum in a case of herniotomy for strangulated hernia, if it be not in a fit condition for reduction, should be allowed to form adhesions in the wound, and then that the excess may be ligatured and cut off with safety. This method, on the face of it, appears to be a contradiction, and yet it gave good results.

What, then, was the cause of these symptoms following ligature and reduction of the stump in his days, and their absence in these? Simply that the ligature was septic, and set up peritonitis with its accompanying symptoms—those of bowel obstruction—and not because the omentum was constricted.

Such a cause may even happen in the present day.

By allowing inflammatory adhesions to form, the general cavity of the peritoneum was shut off, and the ligature, which still *constricted*, could be applied safely. It has been urged

¹ Op. cit., p. 454.

² Op. cit., sect. viii. p. 142.

that in strangulation there is venous congestion and great nerve irritation, which are not present in simple ligature. I cannot, however, bring myself to believe the difference can be of much moment.

If constriction, then, is not the factor in producing symptoms of strangulation, there must be other causes present.

Mr. Rushton Parker¹ gives three:—

(1.) Cases where taxis has been applied, but the symptoms have not been entirely relieved. Herniotomy has been subsequently performed, and only omentum has been found in the sac.

These may be explained by the reduction of the nipped intestine by the taxis, but followed by its tardy or incomplete recovery.

(2.) Cases in which no bowel has been protruded, but in which the herniated omentum has dragged upon the stomach and transverse colon, so as to irritate the former and kink the latter. Mr. Bennett also refers to this dragging as a factor.

(3.) Cases of inflamed omental herniæ, with or without accompanying intra-abdominal peritonitis.

To these I would venture to add three other possible causes, viz.:—

(4.) Cases where a very small piece of bowel—"une petite anse d'intestine"—was hidden by the omentum, and actually returned during herniotomy without being noticed.

(5.) Cases where another cause of intestinal obstruction is present within the abdomen. For instance, Mr. Bennett cites a case where a thin and tense pedicle of omentum constricted the bowel near the ring, but within the abdominal cavity.

(6.) Cases where a patient has an omental hernia, and is the subject of attacks of colic or constipation; it might be possible that one of these should be mistaken for an example of strangulation of omentum producing symptoms of itself.

The effects of nipping of the omentum upon the viscus are congestion, inflammation, suppuration, and gangrene.

When the sac is opened, blood-stained fluid will flow out, and the omentum will be found to be more or less altered in its appearance. Often it is very greatly engorged, with its veins enormously distended. At other times an actual slough has formed, and on incision of the omentum no bleeding will occur.

In certain cases drops of oil have been set free from gangrenous omentum, and may be found floating on the liquid within the sac.

¹ Op. cit.

In a strangulated entero-epiplocele, the gut, coming down last, and being in many cases the cause of the strangulation, is the first to suffer, unless protected by the omentum as it occasionally is.

In one case the omentum was found gangrenous, but the bowel only slightly affected.

Omentum, if at all altered by the constriction, should always be carefully ligatured, adhesions, if any, having been previously separated.

The ligature must be applied to a sound part of the organ, which for that purpose may be gently drawn down.

Transfixation is to be practised, and the breadth of the omentum tied by a series of interlaced ligatures. The knots should be secured as tightly as possible, and without there being any strain or drag on the omentum when they are completed.

This is a very important point, for I have known two cases die of hæmorrhage owing to the slipping of a ligature after reduction of the stump.

Thoroughly aseptic (boiled) silk is, I think, the best material for ligature. Three and a half pounds of omentum has been successfully cut away in this manner.

Healthy omentum, if small in amount, may be returned into the abdomen, but care must be taken that the reduction is complete.

Rarely omentum may become either inflamed, or even gangrenous, after reduction, and it by no means infrequently becomes adherent. Gangrene within a hernial sac also sometimes spreads to omentum within the abdomen.

Inflammation of omentum in a hernial sac is by no means uncommon, and, as has already been mentioned, may give rise to some difficult symptoms from the point of view of diagnosis.

It occurs from causes which would produce peritonitis elsewhere, but is especially liable to follow injury.

It may end in resolution, in suppuration, or in gangrene. It may be confined to the sac, or may extend to the abdomen.

It should be treated by putting the patient in the recumbent position, supporting the rupture, and applying hot fomentations to it, and prescribing small repeated doses of opium.

Before leaving the question of the relationship of omentum to herniæ, it is necessary to mention that occasionally holes form in adherent omentum, and in laparotomies for tumours it is important to ligature such adherent omentum on each side of the hole, for if a hole be left, a piece of bowel may become strangulated by it.¹

¹ Doran, "Gynæcological Operations," p. 212.

Very rarely a loop of intestine may become strangulated in the foramen of Winslow, an aperture formed in the development of the great omentum.

In performing the operation for radical cure on an epiplocele, or entero-epiplocele, it is certainly a bad plan to fix the stump of ligatured omentum in the ring, for by this means adherent omentum is produced, which is always liable to form a band which may give rise to obstruction, and the attachment to the hernial orifice will probably defeat the very object for which the operation was undertaken, namely, the cure of the rupture.¹

iii. DISEASES OF THE GREAT OMENTUM.

Within the abdominal cavity the great omentum is liable to a considerable number of pathological conditions.

(a.) Adhesions are very common. They are practically always the outcome either of inflammation of the peritoneum itself, or of some viscus, whether otherwise normal or the seat of a new growth.

For instance, general peritonitis may produce extensive adhesions of the epiploön, and an ovarian tumour, especially if it becomes inflamed, may cause the omentum to attach itself to the cyst over a large area.

Such omental adhesions can be fairly easily dealt with, for they give rise to much less trouble than adhesions of intestine to the tumour.

A case is mentioned by Vincent Jackson² in which, during ovariectomy, an area of omentum 15 inches by 4 inches had to be removed.

The omentum, by adhesions, may in some rare cases draw the ovaries and tubes up out of the pelvis, but much more usually the omentum is drawn down into the pelvis.

The breaking down of omental pelvic adhesions in exploratory laparotomies may be, and probably is, a cause of the relief to symptoms which not infrequently follows such operations.

(b.) Inflammation of the omentum is commonly part of a general peritonitis. If chronic, it is often due to tubercle. This form is particularly interesting from the frequency with which the condition simulates or is associated with a tumour.³

This is due to puckering and rolling of the omentum until it lies as an elongated firm mass attached to the transverse colon, and athwart the upper part of the abdomen.⁴

¹ Treves, "A Manual of Operative Surgery," vol. ii. p. 520.

² British Medical Journal, 1885, vol. i. p. 1295.

³ Osler, "Principles and Practice of Medicine," p. 238.

⁴ Compare a case quoted under "Anatomy," in an earlier part of the paper.

A similar cord-like structure may be formed in cancerous disease of the omentum, but is said to be much more common in tuberculosis.

Gairdner has called especial attention to this swelling. In children it generally undergoes gradual resolution.

A resonant percussion-note may sometimes be elicited above the mass. Though usually situated in the umbilical region, the omental mass may form a prominent tumour in either iliac region.

(c.) Tumours of the great omentum may be either cystic or solid.

(i.) Cystic tumours of the omentum.

[a.] *Serous*.—This is generally the outcome of peritonitis, leading either to a collection of fluid in the lesser cavity of the peritoneum or encysted by adhesions.¹

I have seen one such case, where the signs closely resembled those of an ovarian cystoma.²

Other cases are instances of lymphangiectasis of the great omentum.³

Removal of the fluid by aspiration after laparotomy may effect a cure, or, if feasible, the cyst itself may be removed, with or without portions of the omentum.

[b.] *Hydatid*.—Usually multiple, and perhaps studded over the peritoneum. Enucleation cures some cases.

[c.] *Chylous*.—The outcome of dilated lymphatics or chyle channels.

[d.] *Dermoid*.—These may arise in two ways, either, as Mr. W. G. Spencer has suggested, from "coelomic tissue," or they may be merely ovarian dermoids to which the omentum had become adherent, and subsequent separation from the primary seat of their origin has resulted. This is the opinion of Mr. Knowsley Thornton, Mr. Bland Sutton, Mr. Alban Doran, and others.

Their obvious treatment is removal.

[e.] *Pancreatic*.—It is not my intention to enter deeply into the highly interesting subject of pancreatic cysts, but merely to refer to such points concerning them as have a special connection with the great omentum and the lesser peritoneal sac.

In passing, however, it may be said that there are three probable origins of such cysts:—

[i.] Injury. The pancreas, although situated quite at the

¹ See a specimen in Museum, R.C.S., No. 1109, where a small cyst may be seen between the two layers forming the anterior part of the omentum.

² See also a case of Dr. Bantock's recorded in *Obstet. Soc. Trans.*, 1881, p. 164.

³ *Brit. Med. Journ.*, 1894, vol. ii. p. 532.

posterior part of the abdomen, and apparently well protected, is, however, occasionally lacerated by kicks, blows, &c.

This laceration will lead to some extravasation of the secretion of the organ, and this occurring with some amount of hæmorrhage causes irritation, and thus the production of an inflammatory cyst wall. Senn has said that pancreatic fluid is non-irritating to the normal peritoneum, but this does not necessarily hold good in the conditions under which it is poured out in cases of traumatism.

[ii.] Inflammation, and consequent stricture of the canal of *Wirsung*, may occur during or after inflammation of the duodenum. Stricture of the duct may also possibly result from its laceration. In both cases fluid may collect distally to the narrowed part.

[iii.] A cavity containing fluid may be formed by the digestive or corrosive action of pancreatic fluid on the tissue of the pancreas which is already the seat of disease.

The great omentum will be found lying in front of the cyst in whatever way it may have been caused.

A traumatic origin is, however, probably the commonest, and the situation of the fluid in such cases is of great interest.

It should here be noted that pancreatic cysts have a great tendency, when caused by traumatism, to have blood extravasated into them. In such cases the fluid may be (*a*) free within the lesser sac of the peritoneum, and possibly actually distending this cavity pretty considerably. Here in the primary lesion it is probable that the layer of peritoneum forming the posterior wall of the lesser sac was torn, and allowed the extravasation to take place into the cavity in front of it. This view is upheld by Mr. Jordan Lloyd,¹ and in support of it he quotes an instance where, on post-mortem examination, he found a considerable portion of the pancreas gangrenous, detached, and free, lying in a collection of fluid contained within the lesser cavity of the peritoneum;² (*b*) or the fluid may be in the loose extra-peritoneal tissue behind the lesser sac, when it will usually be but little in amount; (*c*) and lastly, it may be between the layers of the transverse mesocolon. Here this portion of the bowel will be displaced downwards.

In the first position the stomach will be stretched over the front of the cyst, while the transverse colon will be pressed backwards. These relations are of importance in the question of diagnosis.

¹ British Medical Journal, 1892, vol. ii. p. 1051.

² See also a valuable paper by Dr. Theodore Fisher, Guy's Hospital Reports, 1893, vol. xlix.

Pancreatic cysts are best treated by performing laparotomy, and either securing the cyst to the abdominal wall and draining, or by dissecting out the cyst. Simple aspiration has sometimes proved a successful method of cure.

[*f.*] Hæmorrhagic. Here again blood may be found in the cavity of the lesser sac of the peritoneum, or in the substance of the great omentum itself.

The causes of such extravasations are chiefly traumatism, hæmorrhage into pancreatic cysts, from a rupture of one of the gastro-epiploic veins, especially in portal obstruction, and from acute and gangrenous pancreatitis.

When the lesser sac is distended with blood, besides the symptoms of internal hæmorrhage, a tumour can usually be palpated, or mapped out by percussion, which reaches down a little below the umbilicus, rather lower on the left than on the right side. If the normal cavity of the sac be distended with plaster of Paris or gelatine, it will be found that the stomach is pushed in front and compressed between the mass of injection and the anterior abdominal wall, while the transverse colon is pushed backwards against the spine. The position of the former may be determined by distending it with gas.

M. Simon¹ records an interesting case of a man who died of cholera, in whose abdomen a cyst in the great omentum containing altered blood was found. This during life had given rise to the erroneous idea of a distended bladder.

No cause for this extravasation could be discovered; the gastro-epiploic vessels were apparently quite healthy.

Old blood cysts may be dissected out, or removed with portions of omentum, or drained.

Recent hæmorrhages are best left undealt with surgically.

[*g.*] Lastly, there are abscesses. These are most commonly the result of a perforating gastric or colic ulcer with subsequent localised peritonitis. A blood cyst may suppurate. The pus may be within the lesser sac, or between the omentum and the anterior abdominal wall.

Incision and drainage is the only treatment, but the cases often end fatally.

(ii.) Solid tumours of the omentum. These may be classified as innocent and malignant.

The *innocent* growths include:—

[*a.*] Lipoma.

[*b.*] Fibroma.

[*c.*] Myxoma.

Of these, lipoma is the commonest. It is only natural that

¹ Bulletin de la Société Anatomique, 1858, p. 30.

a tumour composed of adipose tissue should at times occur in the omentum.

Rarely it grows to a very large size, and simulates to a certain degree an ovarian tumour.

Dr. Meredith¹ records a case where he removed one weighing fifteen and a half pounds.

The *malignant* growths are :—

[a.] Carcinoma.

[i.] Endothelioma.

[ii.] Scirrhus.

[iii.] Colloid.

[b.] Sarcoma. Generally spindle-celled.

Any of these malignant growths, except the so-called endothelioma, may be primary or secondary, but probably the majority are of a secondary origin.

Endothelioma springs from the endothelial cells of the peritoneum, and is therefore primary. It resembles the primary carcinoma of the lungs.

Colloid carcinoma, or the degeneration of a colloid form of the cells of other carcinomata, is a very interesting disease. The clinical features of a case are a gradual and great enlargement of the abdomen, more marked in certain parts than in others. The umbilicus is seldom everted, though it may be much stretched.

On palpation firm irregular masses may be felt over the region of the omentum.

Fluctuation, even if there be fluid present, is difficult to obtain, and always indistinct.

On percussion over the front of the abdomen, a large area will be found to be dull, and change of the position of the patient produces no alteration of its extent.

If an aspirator be employed, only some small quantity of a slimy gelatinous fluid will be withdrawn.

The omentum will be found to be very greatly thickened by the deposit.

Any radical treatment of such cases is of course out of the question.

In conclusion, a curious condition which is found in the omentum may be alluded to—I refer to what has been termed “fat necrosis”—on account of its having a bearing on surgery.

There are now several cases on record in which, because of symptoms resembling those of intestinal obstruction, the abdomen has been opened, and this peculiar condition of fat necrosis has been discovered.

¹ British Medical Journal, 1887, vol. i. p. 936.

Further examination of such cases has usually revealed gangrenous pancreatitis, a disease which is apparently often a cause of the necrosis, and therefore should be expected, if on laparotomy the omentum is found thus diseased.

This fat-necrosis consists essentially in the breaking up of the omental fat into glycerine and fatty acids. It may occur in adipose tissue elsewhere, but usually within the abdomen.

In some cases it has been stated that the result is brought about by the action of the bacillus coli communis, and also by a fungus present in the necrotic foci which closely resembles actinomyces. Dr. Rolleston has also suggested that it may be due to some lesion of the solar plexus secondary to hepatic disease.

The condition is a somewhat rare one, but may occasionally be extensive in its area, the great omentum usually being the situation where it is most apparent.

A CASE OF LYMPHANGIOMA (LUPUS LYMPHATICUS) OF THE SKIN.

BY

EDGAR WILLETT.

Cases of lymphangioma of the skin are of sufficient rarity to be recorded carefully whenever they occur, and the one which forms the subject of this communication is the more interesting as the parts affected were removed by operation, and are now preserved in the Museum (Specimen No. 3366^b). The patient was a young Russian gentleman, aged twenty-five, under the care of Mr. Alfred Willett, who has kindly given permission for me to publish these notes. There was a well-marked but rather ill-defined oval swelling on the anterior border of the right axilla, measuring about two inches in its longest diameter; it was soft and fluctuating; the skin over it was slightly dusky, and scattered irregularly over this region were a number of small clear vesicles, the largest of them being of the size of a millet-seed; in places these formed small clusters. The patient stated he had known of this condition since he was a child, and that these vesicles were liable to be broken or chafed by his clothing, when a clear fluid exuded, causing him some inconvenience, and on this account he wished to have the swelling removed. Otherwise he appeared quite healthy, and had no similar affection of the skin in other parts of the body. The tumour was removed by an elliptical incision, which exposed the pectoralis major; the muscle was not involved, and the edges of the wound easily came together. The whole specimen was hardened in alcohol, and a piece near the edge was afterwards examined microscopically. The deeper parts consisted of two or three cysts, the largest of which was as big as a small nut: this was found to contain blood, but there is nothing very unusual in this, as the history of the published cases shows that the larger cystic portions of these tumours are peculiarly liable to the occurrence of hæmorrhage into their interior. No doubt the manipulation at the time of the operation accounted for the

bleeding in this instance. Microscopical examination showed that the tumour consisted essentially of numerous thin-walled spaces, communicating with each other, and lined by a delicate layer of endothelium, similar, in fact, to lymphatic channels in other parts. Although this is the first specimen of this disease in the Museum, there are already two careful drawings of the condition in the Collection (Nos. 520 and 521): both occurred in the axilla and in young women.

As to the name by which this condition should be called, by far the best is *Lymphangioma Circumscriptum Cutis*, as suggested by Dr. A. G. Francis in an excellent paper on the subject published in the fifth volume of the *British Journal of Dermatology*, Nos. 2 and 3, for February and March 1893, pp. 33 and 65,¹ to which further reference will be made.

The name *Lupus Lymphaticus* was suggested by Mr. Jonathan Hutchinson, who first described the disease in vol. xxxi. of the *Transactions of the Pathological Society of London*. Since the term *Lupus* is now used chiefly, if not entirely, in connection with a totally different set of cases, *Lymphangioma* seems a much more appropriate term, more especially as Mr. Hutchinson, in discussing the pathology, quotes a report by Dr. Sangster on one of his cases, stating that the vesicles are "perhaps caused by distension and rupture of the lymph spaces in the papillary layer." A dilated condition of the lymph spaces in the papillary and deeper layers of the skin seems to be the most probable explanation of these tumours. An almost exact analogy is found in the ordinary cutaneous *nævus* of the skin. Why the two kinds of tumours should both be so well defined as they usually are is not so easy of explanation. Another point of similarity between them is that they occur in children or young persons—that is to say, they are congenital. Dr. Francis, in the exhaustive paper already referred to, has collected notes of some twenty-eight cases, in which by far the greater number, in fact, all except two, occurred under the age of twenty-one: the disease seems pretty equally divided between the two sexes, and may occur in nearly any part of the body: it appears to be rather commoner in the region of the axilla than elsewhere. *Lymphangioma* of the tongue, a closely allied condition pathologically, is much commoner: several instances have occurred in recent years in the Hospital, and the tumours have been removed freely and are now in the Museum (Series xii. Nos. 1785f and following): there are also several careful drawings of these and other cases in the collection; they all occurred in young people.

¹ H. K. Lewis, 136 Gower Street, London.

THE DIETETIC VALUES OF FOOD-STUFFS PREPARED BY PLANTS.

A LECTURE DELIVERED BEFORE THE ABERNETHIAN
SOCIETY, OCTOBER 18, 1894

BY

REV. GEORGE HENSLOW, M.A., F.L.S., &c.

The necessity of food may be regarded from two chief points of view: first, the growth and restoration of bodily tissues; and secondly, the supply of energy. Though such (nitrogenous) foods as can accomplish the former may also furnish fat and supply force, yet the value of non-nitrogenous foods may be usefully regarded as having the special function of force-producing, though they can also supply fat as well, in the building up of the structures of the body.

The nitrogenous food-stuffs, called collectively albuminoids, consist of several substances in plants, such as fibrins, *e.g.*, gluten-fibrin, associated with gliadin and mucedin in the gluten of wheat;¹ while legumin and its allies are found in the seeds of leguminous plants. Regarding the value of the vegetable albuminoids as food, it must be borne in mind that they are not so readily acted upon and absorbed as animal albuminoids. This is partly due to the fact that the aleurone grains, as the reserve form of albuminoids is called by botanists, are included within the cells composing the cellular tissue. Cellulose, of which the cell-walls are composed, more or less resists the action of ferments; so that it is important that wheat and other kinds of grain should be completely ground, in order to liberate the cell contents. Secondly, a moderate quantity only of such foods should enter the daily diet, or else a certain portion will escape digestion.

¹ This is easily obtained by washing some flour with cold water in a sieve or cloth, which allows the water to carry off the starch; the gluten is then left behind.

Several minerals are also of great value in the human economy. The majority do not form so obvious a feature as does lime in the structure of bones, but are diffused throughout the system. Similarly are they in growing plants. But analyses show that they become localised in seeds, where they are laid up with temporary reserve food. Therefore the mineral value of such special parts which constitute human food should not be lost sight of from a dietetic point of view. Sodium chloride, or table-salt, is the only one wanting in ordinary vegetables, so has, of course, to be supplied as an extra adjunct to a diet.

The natural orders or families of plants which furnish food to man are not very numerous; one or two contain a large number, while isolated plants in others have special values of their own respectively. The chief is *Gramineæ*, or grasses, of which the cultivated members or cereals are the most important of all foods. The grains are remarkable for containing considerable quantities of both nitrogenous and non-nitrogenous food-stuffs, as well as mineral matters, or "ash." Indeed, cereals alone supply the greater part of all the materials required for restoration and the supply of energy. The *Leguminosæ* follow suit; but their percentage of albuminoids is excessively high in comparison with that of cereals and other foods, so that they require to be supplemented by more farinaceous (starch) and oleaginous substances to form a complete diet. Of isolated species, the potato, sweet potato, and yam are examples of vegetables of wide-spread cultivation, resembling each other in being poor in albuminoids, but rich in starch. Hence they form excellent adjuncts to meat and other nitrogenous—sometimes called plastic—foods, being very inferior flesh-formers themselves. Roots used as food are scarcely worthy to be called nourishing food at all, but rather pleasant additions to a meat-diet, because the percentage of water (upwards of 90) is so great that the actual amount of nutritive matter contained in a portion eaten at a meal is extremely small. The carbonaceous ingredients (especially sugar) are: in carrots, 7.7; in parsnips, 13.7; in beet, 12.5—the average amount of albuminoids being only 0.7.

Taking wheat as a type of a nearly perfect food, the grain consists of a single seed, invested by the dry pericarp or ripened ovary, so that it is really a complete fruit. There are five skins of one-cell in thickness, each the homologues of the pericarp and seed-skins combined. It was thought that the outermost, the cells of which are elongated and of a fibrous nature, was coated with silica, like the surface of a straw; but Professor A. H. Church analysed it, and detected none. He found, however, that, as far as any nutrition was concerned, the ash, 2.6 per

cent., contained only 15.3 per cent. of phosphoric acid, while the high proportion of fibre rendered it nearly valueless. Moreover, "decortication"¹ is also desirable, as the tip of the grain carries bristly hairs, technically called the "beard." One of the inner layers of the husk, called the "cigar coat" from the shape of its cells, is coloured, and gives rise to the varieties known as red, yellow, grey, white wheats, &c. Certain phosphates, &c., are contained by them, so that these inner skins should be, and indeed always are, retained in whole and wheat meal. The most important layer is that next within the innermost skin. It is the outermost part of the endosperm of the seed, or the tissue which contains the reserve food for the use of the embryo or germ. This layer is called the aleurone or cereal layer. It consists of somewhat cubical cells filled with albuminoid grains, accompanied by the ferment cerealine, the function of this ingredient being to digest the aleurone on germination by converting it into soluble peptones. The rest of the endosperm consists of cells radiating towards the innermost part of the grain, and becoming more and more filled with starch, and containing a less amount of aleurone on passing from the circumference to the centre. The germ or embryo lies at the bottom of the grain; the back of it or cotyledon, the so-called scutellum or shield, abuts against the endosperm, while the front or side from which the shoot arises lies outwards.

In the diagram on p. 116, figures 1 to 4 illustrate the preceding remarks.

On germination the ferment cerealine dissolves the aleurone grains, converting them into peptones, the grains themselves consisting of amorphous and crystalloid nitrogenous substances, associated with the so-called mineral globoids or globules of phosphates of magnesia and lime. Another ferment, diastase, dissolves the starch, converting it into maltose and sugar. These are then absorbed through the shield by the embryo.

With regard to the analysis of the germ or embryo itself, Professor Church² found that it is really the most nutritious part of the whole grain, for it contains 35.7 per cent. of albuminoids, diastase, &c., 31.2 per cent. of starch, dextrine, and maltose, 13.1 per cent. of fat or oil, and 5.7 per cent. of ash. Cellulose, or the more or less indigestible matter, is only 1.8 per cent., water being 12.5 per cent. Comparing these with the analysis of the whole grain, it will be seen at once that the

¹ A word used by millers, who, in high-class milling, remove this outermost skin before grinding.

² I am indebted to this author for analyses and some other facts stated in this paper. The reader is referred to his work "Food."

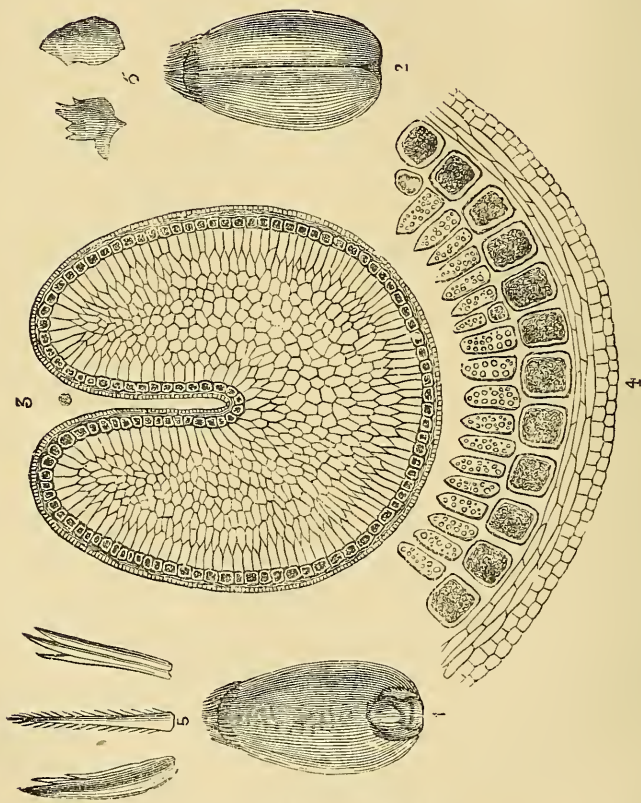


FIG. 5.

Split chaff, awns, &c., from ordinary "whole meal" and "brown bread."

FIG. 3.

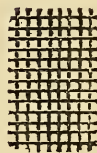
Section of grain.

FIG. 1.

Grain, showing germ and beard.

FIG. 7.

Every particle of wheat-meal should pass through this 18-mesh wire sieve in order to be generally digestible.



18-mesh wire sieve

FIG. 6.

Bran flakes.

FIG. 2.

Grain, reversed.

FIG. 4.

Outermost part of grain, showing five skins of husk, square gluten and inner starch cells.

germ should not be neglected in bread; but it is the universal practice of millers to reject it from the flour, as it discolours it.¹

Wheats from different countries vary greatly in the relative proportions of their ingredients; those from southern and warmer climates containing more nitrogen, while those of northern regions and England are relatively richer in starch. Hence millers make various mixtures before proceeding to grind them into flour. The following examples are Professor Church's analyses of two kinds of wheat, one being soft, white English, the other a hard, red Indian grain.

In comparing the relative amounts of nutritive substances in grains and other foods, it is customary to regard the proportions as ratios, viz., that of albuminoids to carbohydrates with fats. This is called the "nutrient ratio," while the sum of both nitrogenous and non-nitrogenous substances per cent. is the "nutrient value."

Taking the following as an average standard of ratios of a daily ration, the reader will be able to compare the value of any special food with it:—

Water.	Albuminoids.	Starch and Fat.	Salts.
25	: 1.2	: 4.4	: 0.25

The nutrient ratio is 1 : 3.7; the nutrient value, 5.6.

Analyses of English and Indian Wheats.

	English.	Indian.
Water	14.5	12.5
Albuminoids	11.0	13.5
Starch, dextrine, and sugar	69.0	68.4
Fat	1.2	1.2
Cellulose	2.6	2.7
Ash	1.7	1.7

Nut. rat. (English) 1 : 6.5, nut. val. 82; nut. rat. (Italian) 1 : 5.2, nut. val. 84.6.

In the simplest manner of milling, the whole (undecorticated) grain is ground and separated into three siftings, viz., firsts, or the whitest flour; seconds, or that used for ordinary "household bread;" and thirds, or bran. The first contains most starch, and is therefore least nutritious; the second contains more albuminoids; while the bran, with which is removed the

¹ A preparation was invented in 1886 from the embryos for making "germ flour." It consists of the germs extracted from wheat grains with flour, the former being in the proportion of 25 per cent. This is mixed with 2 per cent. of whole wheat-meal. It was prepared by Messrs. Fitton & Son, Flour Mills, Macclesfield.

aleurone layer, contains most of the nitrogenous elements, the germ, as stated, having been previously expelled. Hence it will be seen that the greater portion of flesh-forming materials and valuable mineral ingredients are lost as waste products as far as the making of bread is concerned.

Dr. Oliver¹ has lately called attention to the growing tendency of the working classes to prefer articles of food which "please the eye," and so insist on having their flour "beautifully white," though this is done to the great loss of its nourishing value. Theoretically, whole-meal bread would obviate this error; but practically it is found that unless the corn be most scrupulously cleaned by the miller before grinding, numerous foreign substances are often to be met with, such as sharp-pointed fragments of awns, bristling points of seeds and fruits, pieces of pointed chaff-scales, &c. (as shown in Fig. 5). In addition to these, and even if they be absent, the angular scales of bran (Fig. 6) are found not only to irritate the lining of the intestine, but prevent the complete action of the digestive fluids attacking the aleurone grains included within the cells, so that by no means is the full value of the cereal layer secured in its passage through the body. Hence whole-meal bread is rather to be regarded, at least partly, as an aperient than wholly as a food. "Wheat-meal" bread, as it is called, in order to distinguish it from ordinary whole-meal, is formed of "granulated" flour, the whole decorticated grain being ground by a different process from that by means of mill-stones, so that no irritating substances are present, and the full value of the grain can be secured.²

Though bran contains the most nutrition, *i.e.*, flesh-forming ingredients, it also contains the largest proportion of cellulose or indigestible matter. Hence the necessity of its being very finely ground. The following is Professor Church's analysis of rather coarse bran:—

Water	12.5
Albuminoids and cerealins	13.3
Indeterminate nitrogenous compounds	3.1
Starch with some maltose	43.6
Fat	3.5
Cellulose	18.0
Ash	6.0

¹ "Our Workmen's Diet and Wages," *Fortnightly Review*, October 1894, p. 513.

² Mr. G. Pimm, Flour Mills, Upper Wandsworth, has for the last twenty years supplied an excellent meal of this kind. It should be all able to pass through an 18-mesh sieve, or at least a slightly coarser one (see figure).

Here it will be observed that the fibrous indigestible matter forms one-sixth of the bran, when it is not $\frac{1}{100}$ part of fine flour. Professor Church adds: "If we include cerealin with the true albuminoids, the nutrient ratio of this bran may be set down as 1 : 4; the nutrient value will be 67. This ratio will be perceived to be closely the same as that of a true diet, viz., 1 : 3.7."

Of course, in high-class milling great refinements are obtained. The first grindings are sifted, and some of them are re-ground until an exceedingly fine flour is secured for those who prefer to have the whitest bread; but it is one which is greatly deficient in flesh-forming materials. One of the products is semolina, which consists of fragments of grain which have fallen into the grooves of the stones and so escaped being ground. These are useful for puddings, being mostly of the highly nitrogenous South European wheats; and are therefore more nourishing than ordinary milk-puddings made with starches, such as sago, tapioca, or corn-flour, which contain no nitrogen, that element being only supplied by the milk.

Dr. Oliver, in comparing the ordinary diets of the Scotch and Irish peasants, although that of the latter has much improved of late, shows how by their mainly living on a diet composed of half flour and half Indian-meal, together with potatoes and milk, they do not extract sufficient nitrogen, all three of these vegetables falling short in quantity of that element. Hence he says: "So insufficient is his feeding, that when he comes to this country to take part in harvest operations, it is not until two or three weeks have elapsed, during which he has fed on a more wholesome and sustaining diet, that he is capable of doing an average adult's work."

On the other hand, the Scotchman, by using oatmeal, bread, and potatoes, "gets most for his money, the Irishman the least." A comparison between the analysis of oatmeal and Indian-corn by Professor Church will illustrate the above facts:—

	Scotch Oatmeal.	Indian-corn.
Water	5.0	14.2
Albuminoids	16.1	9.0
Starch, &c.	63.0	66.5
Fat	10.1	5.0
Cellulose	3.7	.0
Ash	2.1	2.0
Scotch oatmeal . nutrient ratio,	1 : 5.7 ;	nutrient value, 102
Indian-corn . . . do.	1 : 8.5 ;	do. 87

It will be here seen that not only are the albuminoids greatly in excess in the oatmeal, but the fat, which can supply more

energy than any other vegetable product, is double the amount of that in Indian-corn.

Passing to the leguminous plants, we here meet with vegetables containing by far the highest amount of nitrogenous or flesh-forming materials of any vegetables. Beans, peas, Indian dahl, lentils, &c., contain upwards of 20 per cent. of albuminoids. Hence their great value lies in the flesh-forming quality. If, therefore, the Irish were to combine some form of pea or bean meal with their diet, their present deficiencies might be readily met. The following analyses by Professor Church show this:—

	Peas.	Haricots.	Lentils. ¹
Water	14.3	14.0	12.5
Albuminoids	22.4	23.0	25.0
Starch	51.3	52.3	56.1
Fat	2.5	2.3	2.0
Cellulose	6.5	5.5	1.9
Ash	3.0	2.9	2.5
	Nutrient Ratios.		Nutrient Values.
Pea	1 : 2.5		79
Haricot	1 : 2.5		80
Lentil	1 : 2.4		86

Although leguminous foods contain an abundance of nitrogen, it must be remembered that it is not all available unless a moderate quantity only enter the diet.

The potato may be taken as the best representative of a carbonaceous food. Comparing it with rice, one of the least nutritious of the cereals, the analyses are as follows:—

	Potato.	Rice.
Water	75.0	14.6
Albuminoids	1.2	7.5
Extractives (solanine, &c.)	1.5	
Starch	18.0	76.0
Dextrine and pectose	2.0	
Fat	0.3	0.5
Cellulose	1.0	0.9
Ash	1.0	0.5
	Nutrient Ratio.	Nutrient Value.
Potato	1 : 17	22
Rice	1 : 10	84

¹ The advertised meal called "Revalenta" consists of lentil-meal mixed with barley or other flour and common salt. The Latin for lentil is *Ervum lens*. This is changed to Erva-lenta; the first two letters being transposed, "Revalenta" is the result.

Flesh-forming albuminoids in the potato being practically nil, the two useful ingredients are the starch and the ash. It will be seen how poor rice is also in nitrogen, though exceptionally rich in starch. Hence its use is like semolina, or even tapioca, for the making of puddings.

With reference to salts contained in the mineral matter or ash of plants, it has already been pointed out that they are diffused in growing vegetables, but especially located in seeds. Herein, as observed, lies the importance of retaining the outermost parts (excepting the superficial layer) of grains of cereals, which are rich in phosphate of lime, magnesia, &c. Potash also abounds in ordinary land plants, while table-salt occurs in saline and maritime plants; but as these latter do not form any part of ordinary diets, this salt has to be supplied in addition. One use of salads, besides being a refreshing, cool diet, lies in the salts they contain; for although, having no amount of nutrition to speak of, in the proper sense of the term, salts are retained in them, while to a considerable extent they are removed by cooking. Their function in the human body, as also in the plants themselves, is for the transference, absorption, and elaboration of oxidisable nutrients. Watercress, it may be mentioned, is particularly rich in salts.

The value of foods in supplying force or energy has had more attention paid to it of late years, since the exact value of work capable of being executed can be ascertained from the amount of heat given by the burning of any organic substance. Oxidation is, in fact, the measure of work.

The non-nitrogenous compounds have been called "heat-givers;" a better term is perhaps "force-suppliers." Of these, starch and sugar, taken as types of their polymers, are called carbohydrates, because the hydrogen and oxygen enter their composition in the proportion which forms water; while oil has a less amount of oxygen, so that its carbon and hydrogen require more oxygen to be burnt. It is thus the greatest force-producer of any organic substance.¹

The following is a table furnished by Dr. Frankland, illustrating the amount of force which each of the substances mentioned can supply; the estimation being the number of tons one pound of each substance can lift one foot in height:—

Butter	4507 tons.
Starch (arrowroot)	2427 „
Cane-sugar	2077 „
Grape-sugar	2033 „

¹ The staple diet of a Suffolk labourer is bread, cheese, and fat bacon.

Comparing butter with peas, it is found that 1 lb. of the latter can raise only 2194 tons. Of this amount only one-fifth at the utmost is available for work done outside the body, according to Helmholtz.

With reference to the degree of *rapidity* with which the force liberated by digestion is at disposal, Dr. Oliver has some interesting observations upon the especial value of sugar.

It appears that the Northumberland coal-miners and English navvies have found out for themselves the great use of sugar as a quick force-giver or active generator of muscular energy. He observes: "There is always a small quantity of sugar present in human blood, viz., 0.1 per cent. When muscle is in a state of activity, there is a disappearance of sugar from the blood, four times greater than occurs in the blood issuing from muscle in a condition of rest, clearly indicating, therefore, that during activity sugar is used up." He refers to experiments by Harley, who "abstained from all food except 500 grammes of sugar daily, *i.e.*, a little over one pound by weight, and he found that there was not only an increase in the amount of work accomplished, compared with that done during fasting, by 70 per cent., but that muscular fatigue was decidedly retarded. It is recognised that when sugar is added to food, a man is capable of doing more muscular work with, than without it, and that this occurs about two hours after it is taken."

Although complete analyses are the only safe methods of ascertaining the exact values of foods, a rough approximation may often be obtained by a microscopic examination, which readily shows (by taking a fair average sample of several observations) the relative amounts of the nitrogenous and carbonaceous ingredients. Numerous foods are advertised for infants and invalids; and, in lieu of a chemical investigation, recourse may be had to the microscope. Thus, for example, Dr. Cutler,¹ New York, finds Ridge's food to be deficient in gluten cells as compared with wheat, while the starch being more or less "frothy," shows signs of being partially cooked. Mellin's food he regards as one of the best, the starch not being in too great an excess, but changed into a soluble form, which he considers to be an advantage. He says: "I place this food very high on the list of prepared infants' foods, as it contains gluten-cells easily visible on inspection."

"Frame food"² bread professes to contain "all the phosphates and nourishing matter of wheat," to be free from woody fibre of bran, and to be easily assimilated and digested."

¹ Popular edit. of "Infants' and Invalids' Cereal Foods under the Microscope." Pub. Gaillard, New York, 1882.

² Advertised by Frame Food Co., Lombard Road, Battersea, London, S.W.

The analysis of Frame food "extract" (to be used with white flour) as made by Dr. Frankland is as follows :—

Water	9.58
Albuminoids	21.40
Starch	13.00
Dextrine	22.60
Sugar	12.30
Other organic matters	10.43
Phosphoric acid	3.68
Potash	4.24
Iron and other minerals	2.77

The nutrient ratio is 1 : 2.7, and the nutrient value is 80.

Of other vegetable foods, numerous starches might be mentioned; but they are all precisely the same chemically, though differing microscopically from each other, so that many can be readily distinguished at sight. As examples, tapioca is granulated starch from *Manihot utilisissima* of Tropical America; sago is obtained from the pith of palm-trees of the genus *Sagus*, the preparation being made at Singapore—imitative forms of this are made from potato-starch; "Tous-les-mois" is from species of *Canna* of Peru; corn-flour is the starch of Indian-corn. In addition are wheat and rice starch. Dietetically, it must be remembered that, as starch contains no nitrogen, it cannot be a flesh-former. It is useful, however, as a vehicle for the nutritive matters of milk when made into puddings.

Space will not allow for a further description of vegetable foods; but what has been said in this paper it is hoped will give the reader at least a clear insight into the general principles of the dietetic values of food-stuffs as prepared by plants.

A CASE OF CONGENITAL ABSENCE OF BOTH PECTORAL MUSCLES.

BY

H. M. BOWMAN, M.D.

A congenital absence of the whole or part of the pectoral muscles on one side of the body has been described by several observers, and is mentioned in *Quain's Anatomy* as one of the abnormalities to which these muscles are liable. As the condition is a decidedly rare one, however, I think the following account of a case I have recently had an opportunity of examining may be of some interest.

F. T. P., aged 24, porter in a warehouse, came up to the Casualty Department for a trifling left basal pleurisy. On his stripping for examination, a striking asymmetry of the upper part of the chest was revealed, though, strangely enough, the patient's attention had never been drawn to it, and he was quite unaware that any unusual condition was present.

On questioning the patient, he stated that he had never experienced any difficulty in his work, which consists chiefly in lifting and carrying heavy bales of cloth. He declared that he plays cricket frequently, being a right-handed bat, and bowling round-arm or under-arm with ease; has been an active member of a rowing club; is a strong swimmer, and has indulged in various gymnastic exercises, being able to breast the horizontal bar many times in succession without difficulty. He has served in a rifle corps for five years, having rendered himself efficient in his drill. As a lad, he never remembered having had any trouble in climbing trees, &c.

The patient is a medium-sized man, with excellent muscular development. There is a deep hollow below the right clavicle, caused by the deficiency in the pectoral muscles, giving rise to considerable asymmetry of the chest, which is rendered more obvious by the large size of the deltoid and the muscles

of the posterior fold of the axilla. The sterno-costal portion of the pectoralis major is entirely absent, so that there is no anterior fold to the axilla. The clavicular portion remains, its lower border starting from a point about one and a half inches from the sterno-clavicular articulation, and it is obviously of larger bulk than that on the left side. While at rest, this muscle appears to form a direct continuation of the anterior edge of the deltoid, though by throwing them severally into action the space between the two muscles can be easily made out. There is no trace of the pectoralis minor. All the other muscles of the arm and of other parts of the body are normal, except that the deltoid and latissimus dorsi, and probably the teres major, are distinctly hypertrophied. The flattening of the front of the chest, which in a cyrtometer tracing amounts to nearly three-



quarters of an inch, is naturally largely accounted for by the absence of the great pectoral, but is also partly due to the altered curve of the ribs, which are undoubtedly straighter than on the left side. This, I assume, may be accounted for by the absence of the traction normally exerted on the ribs in this region by the pectoralis major, since there is no evidence of its having been caused by old lung disease.

The movements of the shoulder-joint are very little interfered with, and, with the exception of the movement of drawing the arm downwards and forwards, which is weaker than on the other side, no obvious difference can be detected in the power of the two arms. Simple adduction seems as vigorous as on the left side, the loss of the pectoralis major being compensated

for by the extra strength of the latissimus and teres major. The movements of the upper part of the chest in forced inspiration are symmetrical.

The nipple is normal in development and situation.

Of seventeen cases of this nature of which I have been able to find records, the deficiency in the muscles has been variable in extent, and in only a few instances has complete absence of the clavicular and sterno-costal portions of the pectoralis major been found, a condition similar to that described above being most frequently present. Apparently the pectoralis minor is always absent, and I do not know of any recorded case of deficiency of the clavicular part of the pectoralis major only.

Other muscles in the neighbourhood have occasionally been missing in addition to the pectoralis, *e.g.*, the teres major and latissimus dorsi, as in a case described by Mr. Hutchinson (*Archives of Surgery*, April 1894), but more frequently no abnormality of these muscles has been described, or, as in my own case, there has been hypertrophy.

The congenital absence of the muscles has, in a few instances, been accompanied by some alteration in development of the ribs from which the pectorales take their origin; thus the flattening of the anterior end of the ribs which I have described above was met with in a patient of Dr. Burney Yeo's, shown at a meeting of the Clinical Society in 1873 (*Transactions*, vol. vi.), and a still more remarkable condition was found in two cases, one Mr. Hutchinson's, the other Reverdin's (alluded to in Mr. Hutchinson's paper), in which the ribs or their cartilages were deficient in this region.

Where allusion has been made to the condition of the nipple, it has been described as normal, except in one instance, in which congenital absence of the pectorals in a woman was associated with complete absence of the mammary gland on the same side (Stern, quoted by Mr. Hutchinson).

As far as I know, absence of the pectoral muscles has never been met with on both sides of the body.

The illustration is from an excellent photograph kindly taken for me by Mr. Grace-Calvert.

THE HISTORY OF DIPHTHERITIC PARALYSIS.

FROM A THESIS.

BY

J. J. MACAN, M.D., CAMBRIDGE, 1894.

Diphtheria, like any acute disease, may be associated with paralysis in various ways; an attack of convulsions may be the first symptom of its presence, or the mode of its fatal termination; an epileptic fit, perhaps the first of a series, may occur at its commencement; hemiplegia may seriously complicate its course, or it may be a predisposing or determining factor in the causation of myelitis or some specific form of paralysis.

But diphtheria is the only acute disease that is followed by a paralysis so frequent in its succession, so typical in its form, and so characteristic in its course and development, that its direct connection with the primary disease is as universally admitted as that of another form of palsy with lead-poisoning, and the paralysis is considered a symptom rather than a sequela of the disease.

The identity of diphtheria with the Syrian ulcer of Aretæus¹ can hardly be doubted, and we have accounts of many epidemics of malignant angina, under various names, since his time; but the allusions to paralysis in connection with the disease are much less common in these accounts than the number of cases now met with would lead one to expect. Such paralysees, when they did occur, may have been attributed to organic disease of the brain or spinal cord, or set down as obscure affections of the nervous system unconnected with the angina; but it seems more probable, as suggested by Trousseau, that the number of cases now noticed does not depend entirely on the increased attention directed towards them, but is partly due to the fact that the diphtheria has now assumed a more toxic character than it formerly possessed.

Various passages in Hippocrates have been pointed out as having more or less bearing upon the symptoms of diphtheria.

In 1861 Littré drew the attention of the French Academy to the account given of an epidemic cough at Perinthus.² This cough was followed by a relapse, in which, if the cough had been slight, the patients, especially children, had nyctalopia; but if the cough was violent and dry, or with the expectoration of hard dry matters, it was followed by angina and paralysis.

Littré suggested that, wide as the signification of the term angina or cynanche was to the ancients, in view of the peculiar character of the expectoration in some of these anginas, *e.g.*, in Cyniscus' patient, in whom "the throat was clean after he had got rid of some large matured spits," it was not unreasonable to suppose the affection to have been a membranous one.³

Arætaeus of Cappadocia, a contemporary of Vespasian (A.D. 69), whose description of the Syrian or Egyptian ulcer I have referred to, makes no mention of any paralytic symptoms, but about the beginning of the second century there lived at Rome, during the times of the Emperors Trajan and Hadrian, a Greek physician, Soranus of Ephesus, some of whose writings are extant in the original. His treatise, *περί ὀξέων παθῶν καὶ περί χρονέων παθῶν*,⁴ is known to us only in the Latin version of Cælius Aurelianus Siccensis, about four hundred years later, but in it we for the first time meet with such symptoms as "vocis amputatio," "loquutio non articulata," "recursus poti liquoris," and "caninus vocis sonitus" in connection with angina.

Ætius Amidenus,⁵ a Christian physician of Byzantium, writing about the end of the fifth or early in the sixth century, gives a good description of the Egyptian or Syrian ulcer, and is a little more definite about the paralysis. He says of sufferers from this complaint—

*φθέγγονται μὲν στεγνώτερον καὶ πινόμενόν τὸ
πόμα αὐτῶν ἐπανακάμπτεται εἰς τὰς ρίνας.*

From this time there is a great gap in the history of this paralysis; it is not mentioned by any of the Arabian physicians, and we do not find anything bearing on the matter till we come to Nicolas Lepois.⁶

In his account of angina he says: "Difficulter deglutiant . . . idque proprie cum potus eis per nares reflat. Vox impedita nihil significat et qualis catulorum est. . . Potui datus per nares remeat, . . . vidit auditque obtuse." But he seems here to be speaking of the malignant form of laryngeal diphtheria just before its fatal termination on the first, second, third, or at latest on the fourth day. Further on he alludes to the expectoration, "quod inter potandum per tussim emergit."

In the chapter on paralysis he writes: "Paralyticis ab angina non totum corpus resolvitur sed usque ad manus duntaxat;" but he also describes as one of the forms of angina "ea specie quæ fit luxatis ad anteriores partes vertebrae."

In 1615 Perez de Herrera pointed out that convalescents from this disease are apt to speak indistinctly, but that their troubles, unlike the similar ones of syphilis, soon disappear.

Carnevali, writing in 1620, speaks of the persistent alterations of the voice, which are also mentioned in 1636 by that *Ætius Cletus Signinus*⁷ whom Fothergill quotes.

Severinus⁸ mentions cases of sudden and unexpected deaths of convalescents as late as the thirtieth or fortieth day, and Bellini⁹ also speaks of paralysis in connection with angina, and of food being returned through the nostrils, though the passages perhaps do not refer to diphtheritic angina.

The next reference to paralytic symptoms is that by Ghizi,¹⁰ in a work which has been quoted by most writers on diphtheria since Bretonneau cited him as an authority. Writing of his own son's case, he says: "We left to nature the care of repairing the strange effects of this malady, effects which were noticed in many cases already convalescent, and which persisted about a month after the cure of the angina and abscess."

In 1747 Malouin¹¹ gave an admirable description of the angina prevalent in Paris in the preceding years, and of the paralysis connected therewith; and in 1749 Chomel¹² mentioned the case of a girl, 6½ years old, who was not really convalescent till the forty-fifth day, continuing to talk with difficulty, speaking through her nose, and having a pendulous uvula; and of another case writes: "I have since heard that after the fortieth day she spoke decidedly through her nose, and had become squint-eyed and deformed. She gradually recovered."

Fothergill,¹³ in 1748, writes: "Those who survived the fourteenth day were thought to be out of danger, at least from the disease itself, though some dropped off unexpectedly after a much longer reprieve, and the consequences of this disease were often felt a long time after it had ceased; an excessive languor and weakness continued for many months, and the voice or deglutition was frequently affected, so as to be perceivable in some almost a year after."

Neither Starr,¹⁴ Wall, nor Huxham allude to any paralytic symptoms.

In 1768 there was an epidemic of gangrenous sore throat at Aumale, in describing which Marteau de Grandvilliers¹⁵ speaks of hemeralopia, the return of fluids through the nose, and a hoarse and nasal voice.

Samuel Bard,¹⁶ of New York, whose work on sore throat was quoted by Bricheteau and Bretonneau, mentions a girl of 2½ years, in whom there was dysphagia and aphonia, and such paresis of the lower limbs that at the end of two months she could hardly walk; in another case he remarked a peculiar sensibility of the larynx with regard to fluids, so that the moment she attempted to drink she fell into a fit of coughing, although she could swallow solid food without difficulty.

From the beginning of this century the mention of paralytic symptoms in connection with gangrenous angina becomes more common. According to Sanné, paralytic symptoms were mentioned in 1809 by Jurine of Geneva and Albers of Bremen, and paralysis of the velum and fauces was seen by Sedillot¹⁷ in 1810, after a catarrhal (!) affection of the pharynx. In the same year Pinel recorded an instance of marasmus after gangrenous sore throat in a girl of 25, accompanied by continued agitation and spasms of most of the voluntary muscles, a very distressing constriction of the throat and an inability to swallow, the liquids passing out of the nostrils. The patient also suffered from pains and singing in the ears. Recovery of deglutition in fourteen days, of marasmus in six weeks.

Hoffmann,¹⁸ in 1815, saw a severe case of diphtheria followed by loss of smell, almost total blindness, heaviness of the limbs, and a tottering gait.

Guimier de Vouvray,¹⁹ in describing an epidemic in 1828, says: "The voice, sight, and lower extremities were affected in many sick in whom the respiratory passages escaped (and in one child of ten who had had croup), and these affections persisted two or three months."

Bretonneau did not lay any stress on paralytic symptoms in his earlier writings, and it was not till Orillard²⁰ published an account of an epidemic in La Vienne in the years 1834-35, that a comprehensive view of the symptoms of generalised and extensive paralysis in direct connection with malignant angina was given to the medical world. In spite of his graphic description of the paralysis, and the prevalence of diphtheria in France, not very much attention was paid to this sequela of the disease till Trousseau and Laségue, in 1851,²¹ published a short paper on paralysis of the soft palate, and Maingault, who submitted a thesis on the same subject in 1854, in 1859 placed the matter before the Medical Society of the Paris Hospitals in his now well-known work.²² It seems remarkable that Trousseau, though he must have been acquainted with Ghizi's letter and the cases mentioned by Bard from Bretonneau's notice of them,²³ and though he had himself seen several well-marked

cases, including that of Dr. Herpin, did not, as he himself tells us, begin to look upon diphtheritic paralysis in the same way as Bretonneau till about the year 1852.

The attention aroused by Maingault's paper was not allowed to subside; very shortly after its appearance Gubler offered to the same Society a communication on the connection of paralysis with all acute diseases, in which he maintained that there was nothing in any way specific in the form which occurs after diphtheria, and that paralysis of the same kind occurred after simple anginas, pneumonia, typhoid fever, and acute diseases in general.

I have given a *résumé* of Gubler's conclusions in the Appendix, and his views will call for further consideration in regard to the pathogenesis of diphtheritic paralysis. They were opposed by Colin and Sée in papers presented to the same Society, and by Trousseau; but, specific or not, diphtheritic paralysis had become a well-known disorder. An abstract from an editorial in the *Gazette des Hôpitaux* describes it as it was then recognised. For the purpose of this essay I would submit the following definition:—

“The paralysis usually associated with diphtheria is one which, in most cases, comes on during convalescence, its onset is gradual, and the soft palate and pharynx are the first parts affected, but it is prone to attack other parts in an order that, if not absolutely constant, is yet so uniform as to be an important element in diagnosis; it exhibits a marked tendency to symmetry; it usually affects sensation as well as motion; it is hardly ever complete in the sense of affecting every part of the body, and is more often a paresis than an absolute paralysis; and, though it occasionally proves fatal by interfering with nutrition, by involving the heart or respiratory muscles, or by some accident or intercurrent disease, as a rule it terminates in recovery.”

APPENDIX.

¹ Aretoei Cappadocis, *De causis et signis acutorum et diuturnorum morborum libri quatuor*, &c. Edited by Boerhaave. Lugduni, 1731, f. ii. L. i. c. 9, p. 7. Part of the passage is given by Bretonneau, N.S.S., 1859, p. 28.

² Littré, Hippocrates, t. v. p. 335, and t. x. i. Littré's communication to the Academy was on June 8, 1861, but Ch. Ravel, in *L'Art Medical*, November 1860, had previously drawn the attention of the profession to the same point. See *Gaz. Med. de Paris*, 1863, p. 530.

³ Cælius Aurelianus Siccensis, *De acutis morbis*, &c. Lugduni, 1567. 8vo.

⁴ Ætius Amidenus, *Tetrabiblion* II. Sermo IV. cap. xlv. Venetii, 1534, fol. For the passage in the text see *βιβλίον ὀγδοὺν* μδ. The passage is quoted in Hirsh's *Handbook of Geographical and Historical Pathology*.

⁵ Piso (Nicolaus), *De cognoscendis . . . morbis*. Francofurti, 1580, fol. pp. 164 and 58.

This Nicolas Lepois of Nancy was physician to Duke Charles III. of Lorraine. See also the same work, preface by Boerhaave, Leyden, 1736, 2nd edit. L. i. c. xvii. *De paralyti*, p. 112, and L. ii. c. iii. *De angina*, p. 310.

⁶ Perez de Herrera, *De . . . garotillo*. Madrid, 1615.

⁷ Carnevalis (Johannes Baptista), *De epidemico strangulatorio affectu*, &c. Neapoli, 1620, 4to, p. 103.

The work is interesting. He believes in the influences of the stars, and quotes freely, not only medical writers, but also Thucydides, Ovid, and Lucretius, *e.g.* :—

“Inde ubi per fauces pectus complerat et ipsum,
Morbida vis in cor mæstum confluerat ægris
Omnia tum vero vitæ claustra lababant.”

Ætius Cletus Signinus, *De morbo strangulatorio*, Roma, 1636, c. i. ad finem: “Ex iis qui pristinam valetudinem consequuntur, anni plus minusve spatio, omnes fere mussitant et verba difficulter efferunt” (c. xii. 5). “Qui demum convalescebat ex hoc morbo diuturniori temporis spatio mussitabat et, ut ita loquar, per nares loquebatur non alia de causa quam quod sphacelo palatus carne nudabatur, et lingua sermonis præcipuum instrumentum illius partis commodo subsidio destituebatur quamobrem mussitatio tam diu durabat quamdiu palatus carne non replebatur et pristinam formam non acquirebat.”

⁸ Marcus Aurelius Severinus of Naples, in the tract, “*Pædanchone Loimoides seu de pestilente ac præsocante Pueros abscessu*,” annexed to the second edition of his work, “*De recondita abscessuum natura*,” 1643, p. 440 (or Lugduni, 1724, p. 529).

“Quinino post XXX dies et XL jam prærepti morbi furoribus, præter

omnium opinionem, ex improvise sunt extincti. Adeo scilicet latitans et recondita veneni vis est."

⁹ Bellini (Lorenzo), "De urinis et pulsibus," 1685, 4to, p. 655, Francofurti et Lipsiæ: "Quælibet deglutientiæ ad palatum perductæ . . . red-dentur per nares quæ si fiant etiam tollitur motus, et æger converti non poterit, sicut etiam in aliquibus partibus puta brachiis ac pectore tolli poterit motus et sensus."

¹⁰ Ghizi, Lettere Mediche, Cremona, 1749. The abscess was below the right angle of the jaws, and pointed under the sterno-mastoid muscle.

P. 20.—*Reflessione settima*.—"Il parlar pel naso, e l'escirne di frequente il cibo, sono stati effetti da me osservati in parecchi per lo spazio d'un mese in circa dopo la guarigione totale della loro angina alle fauci."

He suggests as the cause the injured form, substance, and tone of the tonsils, uvula, and soft palate, which had not had time to recover, and says that in such cases he always found the uvula and tonsils smaller than usual.

¹¹ Malouin, Mémoires de l'Académie Royale des Sciences, 1747: "La même humeur a fait aussi des paralysies qui n'attaquaient que les extrémités et qui n'étaient point précédées d'apoplexies. Ces paralysies avaient encore ceci de particulier que les parties qui en étaient affectées revenaient quelquefois dans leur état naturel lorsque en même temps une autre partie tombait paralytique."

Severinus in 1618 noted the appearance in cattle of a morbus strangulatorius at the time of the local epidemics of malignant quinsy; so here Malouin.

¹² In his dissertation on gangrenous sore throat (translation by N. Torriano, M.D., dedicated to Dr. William Pitcairn, of St. Bartholomew's Hospital, London, 12mo, 1753). The word *contrefaite*, here translated as "deformed," is commonly applied to cases of lateral curvature of the spine.

¹³ Fothergill, John, M.D., An Account of the Sore Throat attended with Ulcers. 2nd edit. London, 1748, p. 17.

At p. 56 he gives a case of a girl of 9, in whom on the third day the stools and urine came away insensibly. She recovered; but this case was probably scarlet fever. At p. 63 he speaks of the danger of sickness, vomitings, and excessive faintness.

¹⁴ Starr, J., Of the Morbus Strangulatorius, Philos. Tr. xlv. p. 1750; he gives a remarkable plate of a bifurcating false membrane.

Wall, M.D., of Worcester, Gentleman's Magazine, 1751, p. 497.

Huxham, John, A Dissertation on the Malignant Ulcerous Sore Throat, 1757.

¹⁵ Marteau de Grandvilliers, Description des maux de gorge épidémiques et gangreneux, Paris, 1768, 12mo.

He also mentions vomitings, and the restoration of the voice by slow degrees, &c.; but he must have taken Ghizi's view of the cause, as he speaks of "un ulcère si rongéant qu'il avait détruit la luette de sorte que deux mois après, les aliments revenoient encore par le nez" (p. 35). Some of his cases were scarlet fever. Besides the eruption, he speaks of "une bouffissure universelle, anasarca, hydropisie de poitrine et l'ascite." He gives drawings of membranous casts from the trachea.

¹⁶ Samuel Bard, *Researches on the Nature and Cure of Sore Throat*, New York, 1771, 8vo, and *Am. Phil. Trans.*, vol. i.

¹⁷ The account of Sédillot's case is given in the *Jour. Gen. de Méd.*, t. xl. p. 181. He particularly states that such paralysis of the organs of deglutition is uncommon, and alludes to Pinel's case, which is given in the article on Spasm in the *Dict. des Sciences Médicales*, Paris, 1812.

¹⁸ Angina Tonsillaris, &c. mit nachfolgender Lähmung einiger Sinnorgane, von John Fr. Hoffman, in Bernberg. *Magazin für die gesammte Heilkunde* (Rust's). 1831.

Auguste H——, 9. 1st December 1815.—Deafness and loss of smell, and almost total blindness. 12th.—“Allein der Nasenton beim Sprechen und das Athmen durch die Nase blieb gleich beschwerlich” (after the separation of several hard crusts), p. 257. 13th.—Great increase in general weakness; loss of sight noticed on the 11th. 17th.—Almost completely blind, p. 359. “Schwere in der Gleidern, unsicherer Gang: der Nasenton beim sprechen minderte sich erst-später.” Taste returned in the course of February, hearing in March (p. 364), and on the 29th April she cried out with pleasure on finding out that she could read the big letters on the title of a song-book on which her eyes accidentally fell (p. 365).

¹⁹ *Mémoire sur une épidémie d'angine maligne ou diphthéritique, qui a régné à Vouvray et dans les communes voisines, à la fin de 1826 et dans le courant de 1827*, par M. Guimier, D.M. a Vouvray (Indre-et-Loire). *Jour. Gen. de Méd.*, 1828, t. civ. p. 165 *et seq.*

²⁰ Orillard (A.) of Poitiers. *Mémoire sur l'épidémie d'angine couenneuse qui a régné pendant le cours des années 1834, 1835, et 1836, dans plusieurs communes du département de la Vienne*. *Bull. Soc. de Med. de Poitiers*, 1837, II. i. 112.

“Quelques malades conservent longtemps beaucoup de gêne dans l'acte de déglutition; d'autres restent frappés de surdité ou de Pamaurose; enfin des désordres plus graves ont été observés dans le système de l'innervation. Toute altération avait cessé du côté de la gorge, les fonctions digestives avaient repris leur activité ordinaire, le sommeil était régulier; mais les fonctions locomotrices ne se rétablissaient pas, les mouvements de préhension ne pouvaient s'exécuter qu'avec un tremblement considérable, les doigts étaient incapables d'exercer le moindre pression. Les malades, s'ils essayaient quelques pas, chancelaient comme pris d'ivresse, et avaient besoin d'être soutenus pour éviter la chute; quelqu'un ressentait de vives douleurs dans les membres. Ces symptômes persistaient quelquefois pendant plusieurs mois pour disparaître graduellement. Chez les sujets affaiblés par l'âge ou par les privations le mort pouvait terminer ces accidents.”

Loyauté, Thèse de Montpellier, 9 Mai 1836, gave two cases of complete blindness.

I have not been able to see the original passages, and have taken the above from Maingault.

²¹ *L'Union Méd.*, 1851, p. 471. “Du nasonnement et de la paralysie du voile du palais:” treating it as a local affection following a local disorder, like muscular paralysis following rheumatic or ordinary inflammation, and not connecting it in any way with symptoms of paralysis in other parts. “A view that might be taken by any one who met with paralysis of the soft palate, and was not acquainted with the general paralysis that occurs

after diphtheria, and one that may be good for some cases" (Hermann Weber).

Morisseau, p. c. p. 499, takes the same view, and gives five cases—four in adults—one persisting many years.

²² Maingault discusses in his Thesis the effects of paralysis of the soft palate upon articulation, deglutition, blowing, and suction, and does not refer to more generalised paralyses. His memoir "*Sur les Paralysies Diphthéritiques*," appeared in the *Actes de la Société Médicale des Hôpitaux de Paris* in 1861, and in the *Archives Générales de Médecine*, t. xiv. 385 and 674. His conclusions were as follows :—

(1.) Numerous observations show that a form of paralysis exists, properly to be called diphtheritic paralysis, coming on during the convalescence of pseudo-membranous affections, malignant angina, or croup, and which is clearly a consequence of the primitive affection.

(2.) This paralysis may be local, and confined to the soft palate and pharynx.

(3.) It frequently affects distant parts ; is sometimes limited to the lower limbs (paraplegia), sometimes extends to all the muscles of the body in succession, to those of the limbs, trunk, and eye, and then assumes a general and progressive form.

(4.) A mild form of angina may be followed by serious and extensive paralysis.

(5.) Albuminuria is in no way the determining cause of the paralysis, since in some cases it does not occur.

(6.) Diphtheritic paralysis seems to be the result of a disturbance of innervation, without lesion of the nervous centres.

(7.) When generalised the paralysis may end in death, but more commonly recovery takes place within a period varying from two to eight months.

²³ Bretonneau's paper on the means of preventing the development and progress of diphtheria appeared in the *Archives Générales* (on the occasion of the death of a son of Dr. Blache's), and contained the case of Dr. Herpin, and also one of a strong boy of 12 or 13, who, three months after the cure of the primary affection, had still such paralysis of sensation that "he seemed to be walking on air." In both these cases the nasal mucous membrane had been affected, a point to which Bretonneau attached much importance in relation to the paralysis.

THE DIAGNOSIS OF DIPHTHERIA.

BY

J. A. HAYWARD.

Since the discovery of the specific bacillus by Klebs in 1879, there is probably no disease to which attention has been more directed than diphtheria, and which can lay claim to so large a share of medical literature and experimental research.

The interest thus aroused has been sustained by the brilliant succession of discoveries which have been reported from time to time, no less than by the fact that, coincidently with a wider knowledge of its pathology, the disease has been, and is still, steadily increasing. It is exceptional, indeed, at the present time, to open any professional magazine, or the reports and transactions of any medical society, without finding at least one paper on the subject, devoted either to a description of fresh experiments in the laboratory, or new methods of clinical diagnosis and treatment.

The demonstration of the bacillus as a means of diagnosis or confirmation has at the present time attained to an equal degree of importance with the detection of the specific organisms in tuberculosis, cholera, anthrax, and other microbic diseases, and at more than one fever hospital a systematic investigation of every case suspected to be diphtheritic in nature is now undertaken. Until this plan is adopted in every institution to which cases of diphtheria are admitted, it is perhaps hardly necessary to point out that any statistics, whether for hygienic, clinical, or teaching purposes, are of very doubtful value; and especially is this of importance with reference to the new method of treatment, now on its trial, by injections of diphtheria antitoxin. In a large hospital with such special opportunities as exist at St. Bartholomew's, it seems somewhat anomalous that such a systematic examination of every case admitted to Radcliffe Ward has not yet been undertaken;¹ for it cannot be doubted that at least a small proportion of the cases admitted are not suffering from genuine diphtheria, and the detection of

¹ This omission has now been rectified.

the bacillus in these doubtful cases is the only method of arriving at a certain diagnosis; and again in this way alone can be decided the vexed question as to whether all cases of primary membranous laryngitis are essentially diphtheritic in nature. During the past year I have examined bacteriologically twenty-three cases which were diagnosed as diphtheria.

In six of these the membrane coughed up after tracheotomy was investigated. In twelve cases an examination was made of membrane occurring on the fauces; in three cases the membrane was obtained from the post-mortem room; in one instance from the eyelid of a child who was suffering from faucial diphtheria, and in another case occurring on the lip; and in addition, I examined the throat of the sister in Radcliffe, and two of the nurses. Before submitting these cases, I wish to point out that, from force of circumstances, my examination was not generally as complete as could be desired; that the material was frequently not recent, and that in many of the cases vigorous local treatment had already been commenced. To obtain any measure of success, I think it essential that the examination should be made early, that material should be obtained personally, and that any one not thoroughly versed in bacteriological methods must be prepared to spend a great deal of time and care in the subsequent separation and examination of the numerous colonies.

These conditions I unfortunately was seldom able to command.

Membrane from Tracheotomy Cases.

Case.	Patient.	Ward.	Date.	Result.	Membrane on Fauces.	Bacillus Recognised	
						By Culture.	By Staining Membrane.
1.	A. S., aged 9 years.	Radcliffe.	Sept. 26, 1893.	Recovered.	Yes.	Yes.	Not examined.
2.	B. H., aged 4 years.	Radcliffe.	Oct. 13, 1893.	Died.	Yes.	Yes.	Not examined.
3.	A. T., aged 9 months.	Radcliffe.	Oct. 26, 1893.	Died.	Not recorded.	Yes.	No.
4.	J. K., aged 1 year 6 months.	Radcliffe.	May 13, 1894.	Died.	Yes.	Not completed.	Yes.
5.	J. P., aged 1 year 5 months.	Radcliffe.	May 23, 1894.	Died.	Yes.	Not completed.	Yes.
6.	E. P., aged 4 years.	Radcliffe.	May 29, 1894.	Recovered.	No.	No.	No.

In Cases (4) and (5) typical bacilli were found by making cover-glass preparations from the membrane; numerous other micro-organisms were present, but the groups of rather long bacilli presenting a terminal club-shaped enlargement, and segregation of protoplasm were unmistakable. The cultures were spoilt by overcrowding of other colonies, and pure cultivations could not be obtained.

Case 6.—The patient was admitted for dyspnœa on May 27, and tracheotomy was at once performed. No membrane was present on the fauces. A very small piece of shreddy membrane was expelled at the time of operation, but none subsequently. This piece was examined after it had remained for two days in a test-tube full of water. Cultivations were also made from the fauces, but no bacilli were found. The boy was discharged with the tracheotomy wound nearly healed on June 5; the urine contained a faint cloud of albumen. The history of the case, apart from the fact that no bacilli were found, renders it doubtful if this was a case of genuine diphtheria.

Case 7.—This patient was sent to Homerton Fever Hospital. Duration of illness, one day. From the cultivations made from a piece of the membrane, only streptococci and staphylococci were at first obtained. The tubes were kept, and examined again one month subsequently. The diphtheria bacillus had now grown abundantly; the other organisms had apparently died, as a subculture from one of the original tubes yielded a pure cultivation of the bacillus.

Case 8.—Transferred to Homerton. No membrane could be detached. Cultivations were made by scraping the membrane with a platinum needle, and rubbing this over the surface of a nutrient agar tube. Typical colonies of the bacilli appeared, together with a variety of other micro-organisms, chiefly cocci.

Case 9.—Transferred to Homerton. The cultivations were made from a very small piece of the membrane, which was obtained with difficulty. No diphtheria bacilli were separated by cultivation. A cover-glass specimen from the membrane, stained by Gram's method, showed a few bacilli like that of diphtheria, but not in sufficient number to make the diagnosis certain.

Membrane on the Fauces

Case.	Patient.	Ward.	Date.	Distribution of Membrane.	Bacilli Found	
					By Culture.	By Staining Membrane.
7.	R. P., aged 2 years.	Surgery.	Sept. 28, 1893.	Small patch, loosely adherent on left tonsil.	Yes.	Yes.
8.	Woman, aged 27 years.	Surgery.	Nov. 28, 1893.	An adherent white patch on the uvula.	Yes.	Not examined.
9.	Girl, aged 5 years.	Surgery.	Dec. 3, 1893.	Loosely adherent patch on right tonsil.	No.	Doubtful.
10.	Nurse C., aged 24 years.	Radcliffe.	Dec. 15, 1893.	Adherent membrane on both tonsils and uvula.	Yes.	Not examined.
11.	Boy, aged 6 years.	Surgery.	Jan. 2, 1893.	Loosely adherent exudation on tonsils.	No.	Not examined.
12.	R. P., aged 2 years.	Transferred from Hope to Radcliffe.	Jan. 26, 1893.	Membrane on both tonsils and pharynx.	Yes.	Not examined.
13.	M. J., aged 9 years.	Radcliffe.	April 26, 1893.	Membrane on fauces: Tracheotomy for membranous laryngitis.	No.	Not examined.
14.	W. P., aged 7 years.	Radcliffe.	May 11, 1893.	Membrane on both tonsils and uvula.	Yes.	Not examined.
15.	E. M.	Radcliffe.	June 12, 1893.	Membrane on palate and pharynx.	Yes.	Doubtful.
16.	Girl, aged 6 years.	Surgery.	June 21, 1893.	Membrane on palate and uvula.	Yes.	Yes.
17.	D. K., aged 22 years.	Private patient.	Aug. 23, 1893.	Membrane on both anterior pillars of palate.	No.	Not examined.
18.	"W. or M."	"From Luke."	Nov. 27, 1893.	Not recorded.	No.	No.

Case 10.—Nurse C—, transferred from Nursing Home to Radcliffe. Had been off duty for four days for sore throat before being warded. Previously to this was working in Lawrence Ward. Patches of thin greyish tightly adherent membrane were present on the uvula and both tonsils. The membrane could not be detached. The cervical glands were swollen and tender. Cultivations were made from the uvula by scraping with a platinum loop and smearing over the surface of (a.) solidified hydrocele fluid and (b.) nutrient agar. The following day small whitish colonies of bacillus diphtheriæ had appeared on the hydrocele fluid, and no other visible colonies of other organisms. The agar tube was covered with very minute colonies of a variety of streptococcus, and larger white colonies of staphylococcus albus, but no colonies of bacillus diphtheriæ were noticed. A subculture on nutrient agar, made from one of the colonies on the hydrocele fluid, resulted in a pure cultivation of the bacillus. Eighteen days later broth tubes were inoculated from the pure cultivation on agar, and after incubation for five days in the warm chamber, three drops were injected subcutaneously into a guinea-pig.

On January 12 (two days later) there was a hard, brawny swelling at the site of inoculation; the guinea-pig was not feeding well, and not very lively. Three minims from the same broth tube were again injected.

On January 14 the animal died. Post-mortem, no noteworthy changes found in the thoracic and abdominal organs. The bacilli were not recovered from the local swelling.

This case is of interest: (1.) On account of the rapid growth of the bacillus on hydrocele fluid before any other organisms appeared. (2.) That two injections were made before death of the guinea-pig ensued. With a virulent culture death usually takes place within forty-eight hours, but in this case the bacillus had been grown for fourteen days on agar in the warm chamber, and again the broth tube had been incubated for five days before the injection was made. Dr. Klein has pointed out that under such conditions an attenuation of virulence takes place. (3.) The rapid disappearance of the bacilli at the site of inoculation. (4.) No bacilli could be detected in cultivations from the fauces fifteen days after the last trace of membrane had disappeared.

Case 11.—The diagnosis in this case was doubtful. The boy had been ill for a week. There was a doubtful history of rash. Branny desquamation was present on the face and chest. The tonsils were swollen, red, and covered with a yellow-

ish exudation. A foetid nasal discharge was present. Four of the house-physicians thought it was scarlet fever, and one, with whom I agreed, that it was diphtheria. No diphtheria bacilli were found by cultivation.

Case 12.—Admitted to Hope Ward for congenital heart disease. Transferred on January 26 to Radcliffe for diphtheria. Readmitted to Hope on March 29 for diphtheritic paralysis. Discharged on May 10.

Case 13.—Tracheotomy was performed for extreme dyspnœa. The patient had complained of sore throat three weeks previously. No membrane was seen on the fauces. Two small pieces were coughed up through the tube at the operation. No bacilli were discovered in cultivations *made from the tonsils*, which were normal in appearance. The urine was albuminous.

Case 14.—Cultivations were made from the membrane on the uvula on hydrocele fluid and nutrient agar. On the latter the diphtheria bacilli were overcrowded by numerous colonies of cocci. On the hydrocele fluid they grew slowly, and pure cultivations were obtained by subcultures. I also examined the air expired by this patient by means of a sterile glass funnel (loosely plugged with cotton-wool at the narrow end), the sides of which were smeared with glycerine. This was placed over the mouth for ten minutes, and the patient directed not to breathe through the nostrils. Cultures were made from the glycerine. Only one colony was obtained, a short streptococcus. The throat had been sprayed with perchloride of mercury 1-2000 one hour before the cultivations were made.

Case 15.—The history of the case is interesting. June 4.—Sore throat and fever. June 7.—Treated as an out-patient for follicular tonsillitis. June 11.—Croupy cough. June 12.—Dyspnœa, for which she was admitted and tracheotomy performed. Urine highly albuminous. Membrane was present on the palate and pharyngeal wall. June 12.—Cultivations made on nutrient agar and hydrocele fluid. June 13.—Colonies of diphtheria bacilli recognised on the agar. Overcrowding from other micro-organisms rendered the bacillus difficult to detect. Pure cultures were obtained from the colonies on the hydrocele fluid.

Case 16.—Transferred to Homerton. Cover-glass specimens made from membrane on the uvula showed masses of

typical bacilli. Colonies grew quickly on hydrocele fluid, and were recognised within twenty-four hours. A guinea-pig inoculated with a pure cultivation in broth died in thirty-six hours, with a firm swelling at the site of inoculation. The internal organs presented nothing noteworthy. The bacilli were demonstrated in specimens made from the local swelling.

Case 17.—The patient, a young man aged 22, was first seen on August 23. For five days he had been “out of sorts,” feverish, with pains in the abdomen and diarrhoea, but there had been no complaint of sore throat. His temperature was 104.5° ; the spleen was felt below the costal margin; distinct tenderness over right iliac fossa; the tongue dry, red, and furred on the dorsum. His general aspect suggested enteric fever. On each anterior pillar of the palate was a white patch of adherent membrane, detached with difficulty, and leaving an excoriated surface. The uvula and palate were slightly swollen and congested. There was no enlargement of the cervical glands. The appearance of the throat was highly suggestive of diphtheria.

In the course of the week a plentiful crop of rose spots appeared on the trunk, and the case ran the ordinary course of a mild attack of enteric fever.

The membrane on the throat was treated vigorously by swabbing with 1–500 perchloride of mercury, and frequent gargles of chlorinated soda, but in spite of this it re-formed daily for eight days. It in no way resembled the appearance of “thrush.”

Cultivations were made on nutrient agar and on hydrocele fluid. No bacilli diphtheriæ were found, but staphylococcus albus, at least two varieties of streptococcus, a sarcina, and a long thin bacillus, which grew slowly on gelatine without liquefaction, but quite different in appearance to the Klebs-Löffler bacillus. In spite of the negative evidence from the cultivations, and the fact that the glands in the neck were not enlarged, I still feel in doubt as to the nature of this membranous appearance on the fauces.

Case 18.—The membrane was sent for examination from Luke Ward. I have been unable to find the notes of the case.

Case 19.—Cultivations made from the epiglottis on hydrocele fluid. Colonies of bacilli were recognised in twenty-four hours.

Case 20.—Cultivations were made on agar from the membrane on the walls of the stomach. Colonies of the bacillus appeared and grew slowly. Dr. Kanthack also examined the membrane and

separated the bacillus. The post-mortem notes state that the appearance in the stomach resembled that of irritant poisoning. Tracheotomy had been performed for laryngeal obstruction.

Membrane from Post-mortem Room.

Case.	Patient.	Date.	Distribution of Membrane.	Bacillus Found	
				By Culture.	By Staining Membrane.
19.	B. B., aged 6 years.	Dec. 30, 1894.	Tonsils, palate, and uvula, epiglottis.	Yes.	Not examined.
20.	G. D., aged 14 months.	Feb. 3, 1894.	Trachea, tonsils, stomach.	Yes.	Not examined.
21.	A. Y., aged 17 months.	June 26, 1894.	Larynx, trachea, bronchi.	Yes.	No.

Case 21.—This case is of great interest. The child was admitted on May 14, 1894, and tracheotomy performed. Membrane was present on the left tonsil, and was coughed up through the tube on several occasions. The case proceeded favourably, and the wound in the neck closed by June 4th. On June 10th the tube had to be reinserted for urgent dyspnoea. On June 11th measles developed. On June 15th a piece of membrane was coughed up through the tube, and this was repeated at intervals before death took place on June 25th. The last four days pneumonia was present and diarrhoea.

Post-mortem.—Lung emphysematous, with numerous large patches of broncho-pneumonia. The larynx, trachea, and bronchi were coated with leathery adherent membrane.

Cultivations were made (1.) from the lung, (2.) the spleen, (3.) membrane in the trachea. The latter yielded abundant diphtheria bacilli, which grew well on agar and hydrocele fluid. None were obtained from the lung or spleen.

It must be supposed in this case, either that membrane was present in the larynx and the trachea during the whole course of the illness, or that a fresh formation took place at the time of the onset of the catarrh which preceded the measles rash. The former supposition is hardly possible, and it seems reasonable to suppose that the bacilli remained latent after the first disappearance of the membrane, and that a renewed growth and development on their part took place coincidently with the catarrhal condition of the larynx and trachea induced by the measles.

Case 22.—In this case a small patch of membrane appeared on the lower lip. Membrane was present on the fauces, and was coughed up after tracheotomy. No bacilli were detected in cultivations made from the membrane on the lip.

Case 23.—The patient, a boy, was transferred from Lawrence to Radcliffe for faucial diphtheria. Osteoclasis had been performed for rickety legs. A patch of membrane appeared on the right eyelid. Typical bacilli were obtained from cultivations made from the membrane on the eyelid.

In the early part of May 1894 there were more than the average number of cases in Radcliffe, and I thought it might prove interesting to examine bacteriologically the throats of the sister and nurses in charge. As is well known, there are many cases recorded where the so-called pseudo-diphtheria bacillus has been discovered on the pharynx and fauces in health; and it has even been suggested that the bacillus represents an innocuous phase in the existence of the true diphtheria organism, but only requires suitable soil in the shape of tissues naturally susceptible, or rendered so by some abnormal condition, in order to develop its specific pathogenic characteristics. Sister Radcliffe and two of the nurses were kind enough to submit to the examination.

Plate and tube cultivations were made. No organisms resembling either of these bacilli were discovered. Streptococci and staphylococci were present in all three cases, and a sarcina in one instance.

In making these examinations, I endeavoured in every case to obtain a piece of the membrane. A small portion was then thoroughly shaken in a test-tube, with relays of sterilised salt solution, and then transferred with the last wash to a sterilised watch-glass. From this it was taken up on a platinum loop, and smeared over the surface of nutrient agar or hydrocele fluid (solidified). From this stock tube a series of subcultures were made at once, in progressive order from tube to tube, so that the organisms rapidly became thinned out; and in the last two or three tubes it was generally easy to pick off and examine, or watch the growth of individual colonies. In cases where membrane could not be obtained, the throat was swabbed with cotton-wool, and cultures made from the mucus or débris which came away. This method was found to be much inferior to that related above.

In the case of Nurse C., where such rapid growth of the bacillus occurred, the membrane on the uvula was merely

rubbed with the platinum loop and hydrocele tubes inoculated directly.

Two trials were made by dissolving a piece of membrane in lime-water and then using a drop of the fluid for making cultures. This method did not succeed, but the experiment unfortunately was not controlled by making cultures in the ordinary way from the same piece of membrane.

The great difficulty in practice was to separate the bacillus from among the crowd of other organisms, chiefly cocci, which are found on the affected mucous surfaces, and especially in membrane.

If the material used is attenuated to too great an extent, there is a risk of missing the bacillus altogether. If insufficiently attenuated, the colonies are too crowded together to render a separation easy.

In diphtheritic membrane there may be relatively few "true" bacilli as compared with other organisms; this is clear from the proportionate number of colonies which appear in the cultures, and also is well seen in stained sections of the membrane *in situ*; and again in some instances the bacillus grows but feebly on nutrient media.

In order to recognise the bacillus quickly and easily, we still require an ideal culture medium, and a selective method of staining. I have used chiefly nutrient agar, hydrocele fluid, and serum for making cultivations. The bacillus grows quickest on the latter, but in my experience does not, as stated, so far outstrip in growth other organisms as to render a separation an easy matter.

Hydrocele fluid I have found most useful, because, although the bacillus does not grow as rapidly as on serum, it has the advantage of being very unfavourable to the growth of the majority of other micro-organisms as compared with the diphtheria bacillus. In several cases the colonies were sufficiently distinct after twenty-four hours' growth. Nutrient agar, of course, is good for the bacillus, and better for the *οί πολλοί*. The disadvantage of hydrocele fluid is that it varies in quality; and on one lot obtained the diphtheria bacillus grew but feebly. The following experiment was performed:—

From pure cultivations of streptococcus pyogenes, staphylococcus albus, and bacillus diphtheriæ, a sterilised test-tube containing salt solution was inoculated and well shaken. A drop from this in a platinum loop was then smeared over the surface of (1.) nutrient agar, (2.) serum, (3.) solidified hydrocele fluid. Within twenty-four hours the agar tube was covered with colonies of streptococci and larger colonies of staphylococci. It was impossible to separate the colonies of the bacillus.

On serum the colonies of all three organisms were also crowded together.

On hydrocele fluid there were many colonies of streptococci visible with the magnifying-glass, and larger colonies of bacillus diphtheriæ and no staphylococcus. The tubes were incubated at 37° C.

The hydrocele fluid is prepared, after collection in a sterile flask, by fractional sterilisation for three or four days, at a temperature of 55–60° C. It is then decanted into tubes, which are kept on the slant in the hot chamber at a temperature of 70° C. In a short time the fluid solidifies, forming a pale yellowish-green semi-transparent medium, a quantity of condensation fluid collecting at the bottom of the tube.

I have lately endeavoured to ascertain the action of some of the common remedies employed locally to the fauces in diphtheria, as well as the relative merits of certain of the agents employed to dissolve the membrane. In the former case the trials are still incomplete, except as regards the common chlorine mixture, which was lately much used in Radcliffe. This appears to have no influence whatever in destroying or controlling the growth of the bacillus.

Solvents of Membrane.—Portions of membrane from a thick tracheal cast were immersed in the following fluids:—

1. *Lime-Water.*—The membrane dissolved in ten minutes, leaving a thin cloudy residue.

2. *Papain* (a saturated solution in glycerine, acidulated with dilute hydrochloric acid).—In half an hour very little difference on the membrane was observed; it was perhaps a little less coherent and the edges were more flocculent.

3. *Peroxide of Hydrogen* (twenty volumes per cent.).—In a quarter of an hour the membrane was thinner and more translucent, and covered with minute bubbles of oxygen gas.

4. *Lactic Acid.*—In one hour no solvent action had taken place.

5. *Bicarbonate of Soda* (saturated solution).—Membrane unaffected in an hour. Mucus dissolved.

6. *Bicarbonate of Potash* (saturated solution).—Result as with soda.

7. *Benger's Liquor Pepticus and Hydrochloric Acid* (warm chamber).—Membrane distinctly looser and more flocculent in half an hour.

8. *Benger's Liquor Pancreaticus and Bicarbonate of Potash* (warm chamber).—Membrane dissolved entirely in twenty minutes.

Experiment with Diphtheria Antitoxin (Schering).

1. On September 24th two alkaline beef broth tubes were

inoculated with the diphtheria bacillus from an actively growing pure cultivation on gelatine, obtained from Case No. 16 in the above series.

On September 26th two guinea-pigs, A and B, were injected in the right thigh with about ten drops of the broth culture; at the same time B, the smaller and feebler of the two, was injected in the left thigh with 1.5 cc. of the antitoxin.

On September 27th a localised swelling developed in both cases at the site of injection.

On September 28th guinea-pig A found dead; B alive and well. Post-mortem on A:—Internal organs normal in appearance. Effusion of serum and a small hæmorrhagic swelling at site of inoculation. A cover-glass specimen made from the effused serum showed a very few bacilli. Cultivations were made from the same on nutrient agar, and resulted in the growth of a limited number of colonies. No organisms grew from a cultivation made from the heart's blood.

On October 2nd guinea-pig B died. Post-mortem:—Internal organs normal in appearance. The local swelling had almost disappeared, and no bacilli in the neighbourhood could be detected in cover-glass preparation or by cultivations.

Thus in this experiment the injection of antitoxin on a single occasion would seem to have delayed a fatal result for four days.

ADDENDUM.

I have recently had the opportunity of examining, bacteriologically, two cases of diphtheritic conjunctivitis from the ophthalmic wards. In both, Dr. Klein's antitoxin was injected, and the bacilli were easily recognised in fresh specimens of the membrane, and by cultivation. No local remedies were employed. Three days after the commencement of treatment the membrane had almost disappeared, and in one case only two colonies of bacilli now appeared on cultivation, whereas in the first instance they had been exceedingly numerous.

A fortnight later no bacilli could be obtained from scrapings of the conjunctiva.

A guinea-pig, injected with a few drops of salt solution containing the bacilli in suspension, taken from a cultivation on gelatine from the earlier of the two cases, died within thirty-six hours, exhibiting the same symptoms and post-mortem appearances as have been mentioned above.

These results appear to favour the view that the injection of Dr. Klein's antitoxin has a distinct local effect on the bacillus and the formation of membrane.

DIPHtheria.

IMMUNITY OF PUERPERAL WOMEN FROM ITS INFECTION—DIAGNOSTIC VALUE OF THE PATELLAR REFLEX.

BY

JAMES ADAMS, M.D.

In 1890-91 I was in charge of the Isolation Hospital at Eastbourne, and in the early part of that period the east part of the town, where the artisan and poorer classes mostly live, was visited by an epidemic of diphtheria. Amongst other facts of interest, I noted the apparent immunity of puerperal women from the diphtheritic poison. This is of practical importance to the medical man attending such cases, and I have not been able to find any reference to it in the text-books.

A. L., aged 1 year 10 months. Admitted May 22, 1890. Discharged July 2. Mild case. Mother confined day before patient's admission. Patient was nursed by mother while she was in labour, and up to an hour of her confinement. The new-born infant had diphtheria, but recovered.

E. G., aged 6. Admitted March 28, 1891. Died April 2. Virulent case. Laryngeal symptoms. The parents lived in a small house, and the mother was confined two days before the child came to the hospital.

G. W. T., aged 14 months. Admitted September 21, 1891. Died September 25. Virulent case. Laryngeal symptoms. The mother was in bed at date of admission, having been confined a few days previously.

Notes of three other cases have been furnished me by their

medical attendants. In one the mother had recently been confined, and a child sleeping in the same room developed diphtheria. The patient was treated at home.

In the second instance the infant, about ten days old, fell ill with diphtheria, and diphtheritic conjunctivitis supervened. The infant was treated at home and died.

In the other case the mother was confined, and diphtheria attacked six children one after the other while she was in bed. They were all sent to a fever hospital.

It will be observed that there were three deaths among these six cases, showing the severe and fatal form of diphtheria, and yet all the mothers escaped, although exposed in such a marked way to infection. No general conclusion, of course, can be drawn from such a limited number of cases. One can only say that these cases go to prove that puerperal women are insusceptible to diphtheria; or, to state it more exactly, that puerperal women are not more liable than others to this disease.

The diagnosis of doubtful throat cases is confessedly difficult, and sometimes there is no decisive symptom present to enable one to give the right name to the disease on first seeing the patient. The border-line between simple tonsillitis, follicular tonsillitis, and mild diphtheria is a narrow one, and often a vanishing quantity; and this led me to test the value of the condition of the patellar reflex in a series of cases to see if it afforded any practical assistance in diagnosing diphtheria. In order to appreciate its worth, I made a note on it in 77 cases on first seeing them. For more exactness in estimating its value in different forms of diphtheria, I divided the cases into virulent, severe, and mild, and the results were as follows:—

	Normal.	Sluggish.	Absent.
Virulent cases	7	5	6
Severe	17	6	6
Mild	14	7	9
	<hr/> 38	<hr/> 18	<hr/> 21

These figures show that in half the cases the reflex is unaltered; and that in the mild cases, where the symptoms are most uncertain, the reflex was absent in nine, which is only a fraction over 30 per cent. of the mild cases. The freaks of the knee-jerk in diphtheria are incomprehensible. For example, two brothers had the disease in a virulent form, and occupied adjoining beds. They both died. In one the reflex was active,

in the other absent. Often I was impressed by the circumstance that a mild case would be in the ward, and on examining, I should find the reflex abolished; and perhaps in an opposite bed there would be a severe or virulent case, with the reflex abnormally active, or *vice versa*. The inference to be drawn is obvious, viz., that the presence or absence of the patellar reflex is of no practical assistance in the diagnosis of doubtful cases of diphtheria.

ON THE GRADATIONS OF HEALTH AND DISEASE.

BY

HARRY CAMPBELL, M.D.

There are gradations of health as there are of disease. All will accept this proposition so far as disease is concerned, though they may not, as I shall attempt to show, recognise its full significance. That, however, there may be degrees of health will not, perhaps, be so readily granted. The tendency rather is to regard the healthy as being all upon the one level. Health, according to this view, might be represented by a horizontal line, A B, and disease by a vertical line, C D, drawn at right angles to and below it, the distances of the various points in this line below the horizontal measuring the degree of the disease. Such a view of health is, however, erroneous. Health has its gradations, and it shades by imperceptible degrees into disease. Instead, therefore, of representing them by two lines, one vertical, the other horizontal, they would be more fitly represented by a prolonged vertical line—A D—, A C, or the health line, being continuous with C D. The highest point, A, will then indicate the most perfect possible health, whence we descend through varying grades of health, and finally passing an arbitrary boundary point, C, enter the region of disease. The distance of any point in the line A D above the point C indicates the degree of health; the distance of any point in the line below C, the degree of disease. If disease be regarded as a partial dissolution, and the degree of dissolution be taken as a measure of the degree of the disease, the justifiability of thus representing the degree of disease will readily be granted.

That the degree of health varies, and that it passes by imperceptible gradations into disease, will be best shown by considering individual functions. Instance the mental function. The essential function of mind is to adapt the individual to his physical and his mental environment, particularly the

latter. The more perfect the mental function, the more perfect this adaptation. Who will contend that mind operates with equal efficiency in all sane individuals—that a Shakespeare is not more sane than an average man? And starting from such a perfect type, we descend through various grades of sanity (A C), and the borderland of hypochondria, hysteria, eccentricity, &c., into the region of actual insanity (C D), and thence deeper and deeper, until we finally arrive at absolute fatuity, when thought is practically extinct. When the impossibility of dividing mankind into the sane and the insane is considered, the truth of my statement that the boundary between health and disease is arbitrary is made manifest.

While different individuals may be relegated in respect of functional efficiency, mental or other, to various points in the vertical line A C D, no individual always remains at the same point, but oscillates above and below his average level. No one, for instance, is always equally sane. During a “fit of the blues” there is a perceptible descent towards the region of actual insanity; and when, on the other hand, judgment is unusually clear and will unusually strong, there is a movement towards a higher than the average level of sanity.

Let us in the same way consider the function of vision. Individuals differ very greatly as to the efficiency of accommodation and fixation, *i.e.*, as to their ability to focus the image exactly upon the retina, and upon corresponding parts of each eye. If the condition of the one or the other is such as to require treatment, we have (unless the case be one of normal presbyopia) to do with disease, but short of this varying grades of adequacy are observed: there are, in fact, degrees of visual health, and in vision, as in other functions, we observe health gradually merging into disease.

The behaviour of the vaso-motor system exemplifies the same truth. When an individual does not get the proper “reaction” after a cold plunge-bath, turning, *i.e.*, very blue and shivering greatly, we have vaso-motor disease; but among those not thus affected, and who may be said to get the normal reaction, varying degrees of efficiency in the vaso-motor system, *i.e.*, of vaso-motor health, may be observed. Those who do not normally react to cold are said to have a sluggish circulation; they suffer from cold hands and feet, and are prone to get “dead” fingers and toes, these latter being due to local vaso-motor spasm. I have notes of upwards of two hundred of such cases, and have observed every degree of spasm, from such slight and transient numbness as can scarcely be termed morbid, to the severest type of Raynaud’s disease, terminating

in death. I know of no disorder which more perfectly illustrates both the varying gradations of disease and the gradual transition between it and health.

If we now turn to the digestive function, we shall find the principle is equally applicable. It is not to be supposed that all who do not suffer from discoverable dyspepsia are on the same level in respect of digestion: it cannot be doubted that among such it is more efficient in some than in others. Thus change of air frequently whets the appetite and stimulates digestion, rendering the latter more rapid and vigorous than before, though, so far as could be judged, it had been perfectly normal. Normal digestion is thus capable of gradations, and that it may insensibly graduate into actual dyspepsia is evident from a consideration of that well-known variety due to hypersecretion of hydrochloric acid. It is manifest that there must be innumerable gradations between the average normal quantity of acid secreted, and such an excess as shall lead to recognisable dyspepsia.

The same line of argument as has been applied to mentation, vision, the vaso-motor system, and digestion may be applied to other functions: to those, for instance, of (*a*) the kidney, (*b*) the thyroid gland, (*c*) the suprarenal capsule, and (*d*) to what we may term the uric-acid function; and these I shall now severally consider in this connection. There is, I take it, a constant oscillation about a hypothetically normal point in respect of all of them—every decided downward movement constituting the earliest beginning of disease.

(*a*.) The quantity of phosphates and the presence of albumen in the urine do not, of course, depend solely upon the kidneys, but for purposes of illustration we may suppose them to do so. Now there can be no doubt that between actual phosphaturia and what may be regarded as the normal excretion of phosphates, innumerable gradations of excessive excretion may occur; and similarly I cannot but think that the metabolism of the kidneys may frequently lean towards nephritis—that, short of unmistakable nephritis, with diminished urine and albuminuria, there may be gravitation towards the same pathological process. I can see no reason why there should be no intervening gradations between the normal condition of the kidney and typical nephritis. Few will deny that such gradations occur in scarlatinal nephritis; and if so, why not also in other forms?

(*b*.) The functional activity of the thyroid gland probably differs considerably in different individuals who would be accounted quite healthy, and also in the same individual from time to time. Thus we can well imagine that an individual may

be frequently on the borderland of myxœdema, and I would suggest the possibility of the so-called lymphatic type being the outcome of defective thyroid activity. A slight defect of this kind persisting through developmental life would permanently mould the organism in a very definite way, though stopping short of producing actual cretinism.

Here we may briefly refer to acromegaly. This disease in a well-marked form is rare, but individuals of the acromegalous type, *i.e.*, with large hands and feet, prominent eyes, large malars, thick lips, large tongue, and deep voice are not uncommon. Of course some of these cases are on the road to actual acromegaly, but others are, I believe, stationary; and bear, I would suggest, the same relation to the actual disease as I have supposed to exist between the lymphatic type and myxœdema. Now, assuming that acromegaly is, like myxœdema, due to faulty action of some limited tissue of the body, then we must conclude that such acromegalous cases are the result of an inclination to some faulty action on the part of this tissue. Such cases afford a good instance of gradation in healthy function, and of its insensible passage into actual disease.

(*c.*) Concerning the function of the suprarenal capsules we know very little, but we may not unreasonably suppose that one of the results of defective suprarenal function is Addison's disease, and on this assumption we can scarcely doubt that oscillations in the efficiency of the function involved in this disease are common, the pendulum swinging, as it were, to and from Addison's disease. In slight defect the result may be unnoticeable, while one more pronounced causes anæmia, pigmentation, &c., yet still not in sufficient degree to render the diagnosis of Addison's disease certain. Such minor forms of this disorder are, in my belief, by no means rare, and afford another instance of the variations in health and of its gradual transition into disease; and with Addison's disease may be grouped leucocythæmia and pernicious anæmia. It seems not unlikely that the normal processes may at times tend in their direction, and that they may exist as minor and perhaps temporary departures from health. The applicability of our principle to chlorosis will be at once acknowledged.

(*d.*) Uric acid plays a conspicuous part in the pathology of gout and gravel. Now it is certain that individuals who have never suffered definitely from either of these disorders, and who would be regarded as in all respects healthy, frequently tend towards them, thus showing gradations in health. The truth of this statement is easily demonstrable in the case of

gravel, for it will readily be granted that between a condition of urine showing a slight tendency to the deposition of urates and uric acid, and one in which the deposition is so great as to cause actual gravel, countless gradations occur. And what is true of gravel is assuredly true of gout also, and, we may add, of the allied diseases rheumatism and rheumatoid arthritis.

The foregoing considerations show that diseases have their degrees, and that minor degrees of well-recognised forms must very often escape recognition, sometimes being so slight as to fail to disturb health appreciably, and again disturbing it insufficiently to produce a typical assemblage of symptoms, and hence misleading the physician, whose conception of any particular disease is largely that of its classical, fully developed, type.

This wide range in the gradation of disease now remains to be considered.

Most diseases are progressive, passing through various stages, *i.e.*, through increasing depths of dissolution, before they reach their limit; there is not, that is to say, a sudden passage from health to pronounced disease, as happens in traumatism, but a progressive sinking into lower and lower depths. In the early phases of every such disease, the patient suffers from a minor degree of it. This fact has less practical interest in those more acute disorders which pass through their phases rapidly than in chronic diseases, in which the patient may for long periods be suffering from a small degree of them. Take, as an instance, granular kidney. We have seen that we may diagrammatically represent the degree of disease or the depth of dissolution by taking various levels in the line C D. Let us suppose that at its termination (*i.e.*, at D) dissolution ensues in death. If now we divide C D into one hundred parts, we divide, as it were, the disease into one hundred grades: we might with equal propriety divide it into a million parts. Now granular kidney may last at least thirty years, or more than a quarter of a million hours; and if we assume, as we may do for purposes of illustration, that the disease advances with equal rate throughout its entire course, then at the end of the first hour the disease will have advanced a quarter of a millionth part along the line C D, and this will represent its degree at the time. Or, dividing the entire period into months, the patient at the end of the first month will be suffering from $\frac{1}{360}$ degree of the disease as finally developed. The same line of argument applies to all chronic progressive disorders, such as locomotor ataxy, cirrhosis of the liver, general paralysis of the

insane. All these diseases must have advanced a considerable extent along the line C D, say one-tenth, before they are diagnosable; and it need scarcely be said that they are often not diagnosed till a much later period.

Not only may an individual suffer from a minor degree of a disease which is destined to become more pronounced: he may also suffer from a minor degree of it in the sense that it never develops beyond this; *i.e.*, in the passage from health a disease may stop short at any point in the line C D. Many instances of this kind have already been given incidentally, such as Addison's disease, myxœdema, chlorosis, gravel, gout, and rheumatism; and the parasitic disorders conform to the same principle. The exanthemata, to wit, may occur in every conceivable degree, and while, on the one hand, the host may destroy the parasite outright, or, on the other hand, the parasite may destroy the host—the victory in either case being supreme and absolute—yet between these two extremes are innumerable gradations and the battle is indecisive. If the parasite is incapable of causing any disturbance whatever, there is manifestly no disease, but if it is able to disturb health in never so small a degree, we have an exanthem. Seeing that the mildest diagnosable form graduates by insensible degrees into the most deadly, we must conclude that the former is led down to through similar gradations from health. A study of natural variations teaches us that any character—the musical faculty, for instance, present in a large number of the species but absent in some—shows every possible grade of development. Have we, therefore, any right to deny the existence of a similar variability in respect of the resistance offered to a specific parasite? *Natura non fiat saltum.*

These *a priori* conclusions are borne out by clinical observation. It is acknowledged that abortive forms of scarlet fever often occur, especially in adults attending children stricken with it; and few will deny that the above remarks strictly apply to this disorder. One is apt, however, to lose sight of the fact that the same law applies to the other exanthemata, and to suppose that the mildest form of typhoid, small-pox, &c., are sufficiently pronounced to be diagnosable. The untenability of this position is admirably shown by the phenomena of vaccination. Some arms do not "take," even though they be inoculated several times; in others the pocks become so malignant that gangrene is threatened; and between these two extremes we observe every conceivable gradation, both in respect of pock-development and the constitutional symptoms attendant thereon.

The infective tumours, including the granulomata and

malignant growths, may all now be regarded as parasitic. How far do they come under the principle of varying grades? Tubercle most certainly does. Not only may it remain strictly localised to the skin, lymphatic glands, and joint structures, in all of which cases it may be recovered from, but, as we know from post-mortem examination, it frequently attacks the lungs in so slight a degree as to be quite undiagnosable during life. There can, indeed, be little doubt that many pulmonary attacks which are attributed to pneumonia, bronchitis, or, more obscurely, to "congestion," and which are completely recovered from, are really tubercular; while less marked cases may scarcely disturb health.

What is true of the granulomata is true also of their congeners, the sarcomata, which vary from almost complete benignancy to the most terrible malignancy; but the principle does not appear to apply with equal force to the carcinomata, which do not perhaps exhibit the wide range of malignancy met with in the sarcomata. It may be argued that carcinoma is present, or it is not; and that if the former, it is unmistakable. But apart from the fact that even when it exists in an unmistakable form, the malignancy may differ considerably, so that one form may kill within a year while another may continue ten or fifteen years, how know we that the disease *is* always decided and unmistakable? For every successful parasitic onslaught, how many unsuccessful and unsuspected attacks may there not be, causing slight nutritional disturbance only?

Syphilis, as regards its general course, is related to the exanthemata, while the characteristic lesions of the third stage—the gummata—belong to the granulomata; and what has been said of tubercle applies also to them. Can we, however, consider the disease, regarded in its entirety, as occurring in every possible degree, like the other diseases I have mentioned? Here it is necessary to observe that, of the diseases caused by external agencies, our principle only applies to those against which some individuals are proof. If the entire *genus homo* is very susceptible to some pathogenic agency, it is manifest that the disease caused by it cannot exist in a minor degree: for example, the bite of the cobra causes marked disorder in all: there is a leap from absolute health to terrible disease. If, however, there be some who are absolutely proof against a given pathogenesis, while others are highly susceptible to it, then, as I have already hinted, our principle holds as a logical consequence. If, therefore, some are absolutely proof against the syphilitic virus—non-inoculable—we must conclude that the

disease may exist in every degree of virulence, being sometimes so feebly developed as to be undiscoverable.

Sufficient examples have now been given to show in what varying degrees a disease may occur, and how needful it is to study it in its imperfectly developed as well as in its more completely developed forms. In this way not only may we hope to interpret many cases—and how numerous they are!—which now completely baffle diagnosis, but also to detect morbid tendencies, and so point out to our patients in what direction danger threatens, and where, therefore, safety lies.

THE LIFE AND WORKS OF PERCIVALL POTT.

BEING THE WIX PRIZE ESSAY FOR THE YEAR 1894.

BY

THOMAS J. HORDER, B.Sc. (LOND.).

I. INTRODUCTORY.

“To simplify the art (of surgery) has been the aim of all the best practitioners of later times, and to this they owe both their success and their reputation. A prosecution of the same method will, I make no doubt, produce greater improvements still.”—POTT, *Preface to “Remarks on the Operation of Amputation.”*

It is a significant fact, and one which offers considerable scope for reflection, that while some names possess the power of calling up at once a train of thoughts and associations, others—of men who have almost or quite as great claims upon posterity so far as their work alone is concerned—scarcely stir the imagination at all. The valuation set upon a man's life and work by the world often depends upon other elements than their mere utility to his fellows. A large part of the estimate which the public mind makes is based, quite unconsciously, upon the *individuality* which manifests itself in any particular instance. Advancement of any branch of knowledge and refinement of any art, however solid and sure they may be proved by future tests to have been, receive recognition according to the cast of character from which the results proceeded, more than for their intrinsic value alone.

This is a tendency which manifests itself very largely in human affairs, and varies in its degree with national temperament especially. It may become exaggerated, and when it does, there is a corresponding increase in the danger resulting. Then mere eccentricities of conduct become mistaken for flashes of genius ; mere opposition to existing authority and existing

customs, however irrational, is regarded as a sign of loftiness of intellect and originality of idea; and the world generally may be all too ready to accord all sorts of divine rights to the man who tickles its fancy by new doctrines and fresh departures, which offer a break in the monotony of the old ones. The only provision is that they shall be promulgated with sufficient cleverness and assurance to cover superficial inspection. But these extremes omitted, the tendency described still holds sway over men's minds, and it is a far more difficult matter for a man whose genius partakes more of strength than of brilliance to become "famous," than one who combines both.

In surgery we linger over the names of Celsus and Paré, Hunter and Abernethy; we enjoy the many reflections which the contemplation of their genius arouses within us; we make them familiar household words; we even catch ourselves delighting in, rather than reproving, any inconsistencies of conduct, coarseness of manner, or brusquerie of behaviour which the truthful consideration of any of them may recall to us; at least, if we do not actually do this, we readily forgive the faults we should eagerly reprimand in smaller men.

But the name of PERCIVALL POTT is singularly devoid of magic. It is *not* a name to conjure with. It is a name which scarcely suggests anything to the lay mind, and very little more to the student of surgery, unless his attention has been engaged in historical retrospect, or he is interested in the annals of the Hospital which directly enjoyed the fruits of Pott's labours. Apart from these conditions, the average student can recall little else than the association of Pott's name with some three types of disease or accident, which first received adequate description and explanation from him. Though these alone would probably perpetuate Pott's name as long as flesh is heir to ills at all, there is still a great mass of surgical knowledge and treatment which owes its birth to Percivall Pott, and has for a hundred years been incorporated into the general text-books of to-day, much of it with very little modification. Beyond this there is also the record of a laborious career of half a century, spent in continuous effort both at healing and teaching, during a great part of which time the subject of our essay was regarded as the most eminent surgeon of his day.

It is somewhat strange that, in spite of all this, the labours of so great a figure in surgery of the last century, forming as they do such a distinct epoch in the science and art to which he directed the whole force of his genius, should be so little recognised. The explanation seems to lie partly in the facts

mentioned at the beginning of this essay, partly in the fact that the work of this master-hand had scarcely ceased when the more brilliant achievements of John Hunter and John Abernethy especially, and of Lawrence and Astley Cooper to a smaller degree, gave surgery the great advance which it received during the close of the eighteenth and the beginning of the nineteenth centuries. These names absorb so much attention, and are so closely associated with the development of surgical methods taking place about this time, that the influence of Pott himself suffers in appreciation. But when we consider that it is to Pott we owe the first real and strenuous efforts to introduce the new system of rational classification of diseases demanding surgical treatment, and a new mode of treatment itself, which met with too much opposition from the prejudices of the older school of surgeons to gain any decided hold in his own day, our valuation of his work must certainly be raised. It was largely an extension of Pott's pioneering labours which formed a great part of both Hunter and Abernethy's advances. These last were the children of a new age in surgical methods, and they entered into the labours of those "other men" whose struggles gave the new age birth, and of whom Pott was perhaps the foremost worker. Hence the credit due to Pott is much greater than appears from the mere enumeration of his discoveries, and the contrasting of these with those of his immediate successors.

Pott's claims to fame are only rightly adjudicated by remembering the conditions under which he worked, and tracing his influence through a sufficiently long period of succeeding years. His claims tend to be obscured by the more pressing ones of his pupils; and this is not a state of things peculiar to the history of surgery alone; instances of similar nature are easily found in all branches of science, and in many of the arts.

But be these considerations settled as they may, it is certain that no list of eminent surgeons is complete that does not include the name of Percivall Pott; the particular position which should be accorded him in that list is, of course, not easily decided, but it is much higher than is indicated by a mere superficial study of his claims to distinction.

II. LIFE.

Our knowledge of Pott's life is by no means extensive. It does not seem to have been of that kind which invites the pen of the biographer; indeed, it seems to have been singularly devoid of those features which provide a field for elaborate

memoirs. This is in accordance with the difference of popular appreciation, which we have already pointed out, between Pott and other notable figures in his profession. It is to Pott's son-in-law, Sir James Earle, himself a disciple and successor of Pott of no small repute, that we owe nearly all we know of the personal or domestic character of the latter's life. Compared with the carefully collected details of Abernethy's life and character which his pupil Macilwain has given us, these notes of Earle's are scanty in the extreme. Though Earle is doubtless a faithful historian, he is an aggravatingly brief one, and he seems to have found the same difficulty in compiling his record, as we have previously mentioned—lack of material.

Percivall Pott was born on January 6, 1713 (1714?), in a house in Threadneedle Street, where the Bank of England now stands. His mother was left a widow for the second time only four months later, and as the result of this, Dr. Wilcox, Bishop of Rochester, and a distant relative of the family upon the mother's side, took young Pott under his immediate patronage; for Mrs. Pott found herself left with very inadequate means. Her sole thoughts and care were expended upon giving her boy as good an education as possible, and Percivall appears to have fully reciprocated all the affectionate solicitude bestowed upon him by his filial attention to his mother during the remainder of her life.

He was sent to school when seven years of age, at Darenth, in Kent, where was laid the foundation of that classical knowledge which he afterwards greatly extended, "even to critical accuracy."

Young Pott early showed a strong propensity to the profession of surgery, and his determination was not altered by chances of preferment in the Church, though these were assured him. So on 1st August 1729, when only sixteen years of age, he was "apprenticed" to Mr. Nourse, surgeon to St. Bartholomew's Hospital.

Mr. Nourse was one of the few surgeons who gave lectures in anatomy at this time; these took place at London House, in Aldersgate Street. It was not until some twenty years later that lectures were commenced at the London Hospital by Mr. Harrison, though at St. Thomas's—or in connection with it—William Cheselden, the famous surgeon, had lectured on anatomy and surgery since 1718. According to a statement made in the Hospital Calendar, these lectures at St. Thomas's were the first ever given by Parliamentary grant; but the authority for this is doubtful. We find young Pott acting as "prosector" to Mr. Nourse for these lectures—preparing the sub-

jects for demonstration—and we can readily understand how it was that he so early laid the foundation of the more accurate knowledge of anatomy which he applied in later years.

If we glance at the position of surgery at this time, we find it miserably defective, both as a science and as a handicraft. The instruments were of the crudest kind; the operations often, as a natural consequence, of the most brutal character; useless applications of both bandages and drugs were prevalent; “prescription too frequently held the place of reason,” and “want of real knowledge was concealed under a pompous garb and specious demeanour.” Indeed, a *science* of surgery could hardly be said to exist at this time, for any attempt at classification, or at search for cause and observance of effect, was scarcely seen. The time, then, was quite ripe for the appearance of a mind which should do for surgery what so many other minds were already doing for other sciences. These last had made prodigious strides during the decades immediately preceding the time of which we write, and these must have had their influence upon surgery and medicine, whose participation in the general revival was wanted to complete the march of progress. The herculean labours of Newton were just ended—the great philosopher died just two years before Pott’s apprenticeship (1727). Bacon’s influence was still fresh as a guiding principle for scientific research, and was fast becoming a long-needed check upon the useless speculations and fruitless discussions of the schoolmen.

We read that Pott himself early adopted Bacon’s advice, “to consider one part and one disease at a time, and to become fully acquainted with that before undertaking another.” He gave a good deal of attention to the early authors of surgery, and he always professed great regard for them. The influence of these works of ancient authorities is very manifest in his own literary productions. Earle tells us that his reading in this direction was very wide; if so, we can only appreciate the significance of the fact by remembering how voluminous these old writers were. Pott regarded them as “more valuable for their accurate descriptions of diseases than for their practical value.” An excellent memory is said to have been one of Pott’s possessions, and its value was evidently well appreciated by him.

Pott finished his seven years’ apprenticeship, for which £210 had been paid, on 7th September 1736.

The following extract from the “Court Minute Book of the Barbers’ and Surgeons’ Company” relates to Pott’s examination for a diploma at this time:—“At a subsequent meeting of

the Court of Examiners, September 7th, 1736, the question being put whether Mr. Percivall Pott should be examined at this Court, he not having waited on all the Governors and Examiners to desire the favour of their presence at his examination, and it appearing to the Court that Mr. Pott had been sent for out of Town to attend Sir Robert Goodsall's Lady, where he was detained so long as not to be able to return within the time limited for his attendance on the Governors and Examiners, and Mr. Warden Petty having been pleased to say that he would make his excuse to the Court: It was Resolved that the Court would proceed to the examination of the said Mr. Pott notwithstanding his default in attending the Examiners, but this is not to be a precedent in time to come to any other person."

And then:—"The said Mr. Percivall Pott was examined touching his skill in Surgery in order to have the Great Diploma: his answers were approved, and he ordered a Diploma under the seal of the Company and the hands of the Governors testifying his skill and Impowering him to practise."

In the same year (1736) we find Pott taking a "business" in Fenchurch Street. He was then only twenty-three years of age. Here, too, he took his mother and her daughter (Miss Houblon) by her first marriage. He seems to have been very successful at this time; and the next incident of importance is his election as Assistant-Surgeon to the Hospital, which took place in 1744. Five years later he was elected one of the principal surgeons, and this position afforded him all the scope for exercising his skill which he had desired.

Pott found at this time that the ordinary practice of the Hospital consisted largely of the more severe forms of treatment that had been inherited from the older surgeons,—the maxim "*dolor medicina doloris*" still remained unrefuted." The actual cautery appears to have been in very frequent use, for we read that it was regularly heated and prepared when the surgeons visited the wards. To this old system, with all its inflictions and artificialities, Nourse rigidly adhered. Pott, on the other hand, early seized the truth that nature needs milder assistance when attempting to overcome abnormal conditions than is provided by the severities of the older school of surgery. He lived, too, to see these remains of barbarism set aside, and a more humane and rational plan, of which he was the chief author, universally adopted.

In 1746 Pott's mother died; he had removed to Bow Lane some time previously. Shortly after he married Sarah, daughter of Robert Cruttenden, Esq.

Ten years later an incident occurred which marked a decided

epoch in Pott's life. As he was riding home from a professional visit his horse stumbled, and threw him on the stone paving of the street. The accident resulted in a compound fracture of the leg. Remembering the evil effects which he had often seen follow rough treatment on occasions such as these, and how the wound was often aggravated by an improper position of the limb and body, Pott refused to be moved until he had made the necessary preparations for his transport. Although the accident occurred in Southwark, he sent as far as Westminster for a couple of chairmen and poles, remaining upon the cold pavement—it was in January—until they arrived. He ordered the men to nail their poles to a door, for the purchase of which he had meanwhile arranged. This being done, he caused himself to be laid upon the improvised stretcher, and was carried in this way through Southwark and over London Bridge to Watling Street. A consultation was held upon the case, and the decision of the surgeons was unanimous that an amputation was necessary. To this Pott assented; and it appears that the instruments were actually prepared for the operation, when Mr. Nourse entered the room. On examination of the limb, he concluded that there was a possibility of its being saved. The operation was discarded, and Nourse's prognosis eventually turned out correct. The leg was saved, and that it was so was doubtless due to the fact that Pott's own caution and care after the accident had prevented the onset of fresh complications. In his interesting address to the Abernethian Society at the commencement of the Summer Session of 1893, on "Percivall Pott," Mr. Butlin pointed out that our thanks are due to what must have at the time appeared but a grave misfortune; for to this accident, and the consequent retirement from active life for a season, we probably owe the records of observation and treatment which Pott's writings afford us. In Earle's bibliography we see that, previous to his accident, Pott had only published one fragment of professional writing—the history of a case of tumour by which softening of underlying bone was produced, and which appeared in the "Philosophical Transactions" of 1740. But a mind as active as Pott's could not possibly remain idle during this period of convalescence. The exhaustive work on "Ruptures," which was published a year later, was largely written during the time immediately following the accident. And once the ice was broken in respect to publishing, other works followed, and for nearly twenty-five years Pott was continually engaged in giving to the world the valuable results of his keen-sighted investigations and his successful efforts to relieve the sufferings of his fellows. In 1757, as we remarked, his work on "Hernia "

appeared, and in the same year the memoir dealing with "Congenital Hernia" was issued. This was followed during the next year by "Observations on that Disorder of the Corner of the Eye commonly called *Fistula Lachrymalis*."

In 1760 appeared the extensive work dealing with "Injuries of the Head from External Violence," including the consideration of wounds and contusions of the head, fractures of the skull, concussions of the brain, &c.

Two years later Pott published his work upon "The Hydrocele, or Watery Rupture, and other Diseases of the Testicle, its Coats and Vessels, illustrated with cases."

After a similar interval (1764), he communicated to the "Philosophical Transactions" his paper entitled "An Account of a Hernia of the Urinary Bladder, including a Stone."

The next year appeared the book dealing with "The *Fistula in Ano*," and describing a new and simple means of cure.

It was about this time (1765) that Pott instituted a regular course of lectures on anatomy and surgery; for though called lectures on "Surgery," they abounded in anatomical references, and sought to make surgery the more feasible by giving it the only proper basis it can possibly be built upon. We have perused the manuscript notes of Mr. Pott's lectures which are in the possession of St. Bartholomew's Hospital, and though they doubtless suffer considerably from transcription, they evince a mastery of the subjects dealt with which is truly remarkable when we consider that lecturing of any sort was still in its infancy at this time. The general plan adopted is first to deal with disorders which are liable to affect *any or all* parts of the body, and then to consider those which are merely *local* in their ravages, affecting particular organs. When we consider the state of surgical knowledge at the time when these lectures were delivered, and reflect upon the comparative newness of the principle of tuition by lecturing at all, we must give Pott great credit for such scholarly and eloquent deliverances as we have handed down to us. If we look for more than this, however, we shall probably be disappointed. There is little in these lectures which gives us evidence of any serious attempts to *classify* or to *generalise*, or indeed to do what these combine to do—make a rational *science* of surgery. In Pott's published books, however, we do get more of this type of work, for the classification of his observations, and his efforts to connect cause and effect, are often very apparent, and probably account for the influence of these writings upon the age which saw their production. It was to Hunter, one of Pott's pupils, that this task was specially left, of reducing to axiom and generalisation the fundamental

facts of surgical knowledge. But though this honour be accorded to Hunter, it is still true that the first foreshadowings of such advance were seen and brought to light by Pott.

Among Pott's pupils besides Hunter we note John Abernethy, Sir James Earle, and Sir Charles Blicke. Of all the lecturers officially recognised at this time, Pott was certainly the foremost. His contemporaries in lecturing were Joseph Else, who was appointed to "read lectures" to the pupils of St. Thomas's Hospital in 1768; Mr. Cline, who was associated with the latter in the same office in 1781; Mr. Thompson, at the London Hospital—the first surgeon in England who performed the operation of amputation of the leg at the hip-joint—who was appointed successor to Mr. Harrison in 1755; and Sir William Blizard, who followed Thompson in 1781. Neither of these, either as surgeons or as lecturers, achieved the distinction of Pott, and it was not till a later period, when first Hunter, and then Abernethy, laid a firmer foundation to surgical and medical tuition by lecturing, that Pott's own efforts in this direction were eclipsed.

In 1768 appeared a new edition of his work on "*Injuries of the Head*," and this was accompanied by "a few general remarks on fractures and dislocations," which is really a treatise in itself.

In 1769 Pott removed to a house near Lincoln's Inn Fields, and three years later published a new edition of his work on hydrocele, and also "an account of the method of obtaining a radical cure by means of a seton."

In 1775 appeared a new work, "*Chirurgical Observations relative to the Cataract, the Polypus of the Nose, the Cancer of the Scrotum, and the Mortification of the Toes and Feet*."

Two years later (1777), Pott again removed, to Tenterden Street, and there appeared his "*Remarks on the Necessity and Propriety of Amputating in Certain Cases*." This was followed, in 1779, by "*Remarks on that kind of Palsy of the Lower Limbs accompanying a Curvature of the Spine*," &c.

In July 1787, Pott resigned his position as Surgeon to St. Bartholomew's Hospital, which he had served, "man and boy, nearly half a century." He had indeed been its faithful and skilful servant for the long period of forty-two years, and now—an old man of seventy-four years—he parted from the scene of his great labours. No wonder his resolution forsook him when, in the Great Hall of the Hospital, he received the congratulatory eulogiums of all by whom the great institution could be represented. The final scene was very shortly to follow. Pott had but resigned his surgeonship eighteen months,

when, visiting a country patient, on the 11th of December 1788, in very severe weather, he caught a fatal chill. This was on the Thursday. After a short retirement to his bed, he again commenced his routine of visits, starting out on the following Sunday to see some patients in town. This exposure resulted in a renewed chill, followed by the usual steps—shivering fits, fever, delirium. On the eleventh day after his first seizure, after a gradual sinking, he expired, 22nd December 1788. His last conscious words were, “My lamp is almost extinguished: I hope it has burnt for the benefit of others.” That it had, we who live after him have ample means of testifying. He was buried at Aldermay Church, in Bow Lane, close to the remains of his mother.

III. SURGEON, TEACHER, WRITER.

The only distinctions we have yet mentioned as falling to Pott's share of professional advancement have been connected with his Hospital career; but in 1764 he was elected Fellow of the Royal Society—a recognition of his achievements which far exceeded any merely social distinction that could have been given him. In 1786 the Royal College of Surgeons of Edinburgh gave him an honorary diploma, which possessed the special merit of being the first ever granted by that institution. The following year—that in which he retired from the Hospital—he received a similar mark of appreciation from the Royal College of Surgeons of Ireland. Nearer home a whole scale of distinctions had come at different intervals from the Barbers' and Surgeons' Company, and from the Surgeons' Corporation, of which latter body he was elected governor in 1765, replacing Robert Young in that office. Abroad his reputation was only eclipsed by the fuller acknowledgment of his genius at home. Several of his works were early translated into French and were widely read.

Of Pott's personal appearance we know little. Earle states that his person was “elegant, lower than the middle size,” and that his habits were indicative of great vigour and activity—all of which observations are too vague to enable us to form much definite conception of our man. The classical painting of Pott which is in the possession of the Hospital tells us just as much as such official portraits usually do. Besides a rather remarkable leaning towards that type of feature and expression which is represented *in primo* by Samuel Johnson, there is nothing to attract attention.

In domestic life Pott seems to have been as excellent a son, husband, and father as his public life would suggest. The postponement of his marriage till after his mother's death is a significant illustration of his filial devotion.

As a *teacher* we know him to have excelled. In business matters we may gauge his correctness and assiduity by reflecting upon the one fact that he "kept a record of the exact amount of every individual fee which he had ever received."

To judge of him as a *surgeon* leads us to consider the alterations which he was enabled to introduce, and help in carrying out in many directions. He is universally acknowledged to be the "principal author of that simplicity which distinguishes the present practice (of surgery) from that of our ancestors." On this account Pott is specially celebrated for the mildness and humanity of his treatment—divesting surgery of its chief horrors, and substituting more rational modes of practice for the barbarous expedients hitherto employed. Among other things, the actual cautery came into disrepute largely through his strenuous efforts to discourage its use.

Pott was the inventor of several useful surgical instruments, which served the purpose of helping on the new order of things. These instruments are remarkable for their simplicity, and are quite in harmony with the methods he constantly adopted in using them. Thus, in dealing with the various modes of treating skull fractures, with and without depression, Pott points out that the complexity and inadequate nature of the instruments previously used made the results of operations too often fatal:—"An attentive consideration of what our remote ancestors have delivered down to us on the subject may satisfy us that their observations on the appearances and symptoms of the ills attending this kind of injury, *i.e.*, fracture of the cranium, were in general extremely just and true, perhaps more so than those of many moderns; that their curative intention or method of aiming at relief or cure of such ills was rational and just, but that the instrumental part of their art was so deficient, so awkward, and so unhandy, that they were thereby not only in general prevented from accomplishing the good they intended, but were not infrequently driven into almost unavoidable mischief."

Then Pott proceeds to give it as his axiom in the performance of surgical operations that "reduction of the number of instruments to be used in an operation, and an extreme simplicity and plainness in those which may be required, are a part of the merit of modern surgery." "Instead of a multiplicity of instruments"—here giving illustrations of the various forms in

use by the older surgeons : “modioli,” “terebellæ,” “scalpers,” “clysters,” &c.—“we now only require a trephine and an elevator, and a pair of forceps now and then.”

Pott was imbued with a just and inveterate hatred of *quackery* of all kinds ; his whole writings are a tirade against whatever empiricisms came across his path. Whether the existence of these was merely due to the dishonourable intentions of ignorant pretenders, or whether they were but the remnants of a system that had its root planted in a soil very deficient in those facts and principles likely to conduce to sturdy growth, they all received their due exposure at Pott’s hand. He is always ready to give his contemporaries or his predecessors credit for good intentions, but he does not fail to tell them honestly that custom must give place to reason and truth when these are waiting for application. The mere practice of surgery from the study of books, without any assistance from careful observation of phenomena presented day by day, he sternly rebukes. And any expedients which may be adopted merely to save the surgeon’s reputation, or enhance the public’s good opinion of his skill, he does not hesitate to denounce and call by a very plain name. The ethics of *operating* receive a good deal of attention from him, and indeed this is perhaps the most likely of all a surgeon’s functions to prove a source of temptation where public applause is concerned. We append a few quotations from Pott’s works illustrative of these remarks. In his preface to the work on “Ruptures,” he sounds the keynote, and indicates the opinions which he adheres to in his later writings. He says : “That the merit of many of the old practitioners was great ; that they left behind them many proofs both of their sagacity and their dexterity ; that we have received large information from their writings ; and that, *cæteris paribus*, he who is best acquainted with them will be the best surgeon, is well known to every one who is at all conversant with them, and can be denied only by those who are not. But, on the other hand, it must be allowed that both their theory and their practice laboured under great disadvantages, which rendered their judgment of many diseases erroneous, and their treatment of them irrational and unsuccessful. The very imperfect state of their anatomy was one great source of error, which kind of knowledge has been so cultivated in our times as to convert ignorance into a vice, and to render those who are deficient in it perfectly inexcusable. . . . The ancient surgery was coarse, loaded with a farrago of external applications, some of which were horridly and yet unsuccessfully painful, and others altogether useless ; whilst the operative part

of the art was encumbered with a multitude of awkward unmanageable instruments and pieces of machinery."

He then proceeds to congratulate many of his contemporaries because, "instead of obstinately adhering to the practice of their ancestors, they have differed from it in many instances, where they found they could do so with safety, and to the advantage of mankind; and have endeavoured to advance the utility of their profession by the only means whereby it is capable of being improved, by a sedulous application to anatomy, by the frequent examinations of dead morbid bodies, and by making such experiments on the living as they had just reason to think would prove beneficial; candidly acknowledging at the same time where they found their art insufficient, and not persisting in tormenting their fellow-creatures merely for gain."

Towards the end of the same work Pott reiterates the assertion previously made, that "the means used to obtain both a palliative and a radical cure were exactly the same" (for hernia). He then goes on to say: "They who are unacquainted with the true nature of this disease may probably be surprised at this assertion, and be thereby induced to believe, what has in all times been so confidently asserted, that there are methods and medicines whereby this disease may always be perfectly cured; and that the surgeons either through indolence will not get information of them, or through obstinacy will not practise them. . . . Several of these methods have indeed the sanction of antiquity, and have been described, and even practised, by many of the old surgeons: the principal of these are the *cure by cautery*; the *cure by caustic*; the *punctum aureum*; the *royal stitch*; and the *cure by incision*."

After describing these operations severally, giving the authorities for each, and depicting the inevitable results, he continues: "If the preservation of life was the object of these means, something might be said in their vindication; the *anceps remedium* must for ever be preferable to desperation; but that is not the case; they are recommended to be put in practice when the patient's life is in no kind of danger, and are destined merely to save him the trouble of wearing a truss, which purpose they can seldom answer. . . .

"No disease has ever furnished such a constant succession of quacks as ruptures have; they who have had some smattering of anatomy or surgery, and whose humanity has not been their prevailing quality, have adopted one of the preceding operations, or something like them, while they who have had less knowledge and more timidity have had recourse to the more sneaking knavery of specific applications. . . .

"I shall conclude by wishing that they who have capacity to judge of these matters (which are as much the objects of common-sense as any other kind of knowledge) would not suffer themselves to be deluded by the impudent assertions of any charlatan whatever, but determine in this as they do in many other things, that is, by the events. In short, if they who have so much credulity as to be inclined to believe and trust these lying impostors, would only defer the payment of them till they had completed their promises, the fallacy would soon be at an end."¹

"The mere curing diseases is not all; that was done (sooner or later) while surgery and anatomy were in their most imperfect state, and while every branch of medicine laboured under many inconveniences which are now happily removed; but the different methods in which surgical disorders are treated, or their cures attempted, will make so considerable a difference in the confinement and sufferings of the patient as to be very well worth attending to."²

"I cannot omit the opportunity of adding a few words upon a subject which appears to me highly deserving of some notice, as its influence may be very extensive and very prejudicial; it is the false idea which the bystanders at a surgical operation generally have of chirurgic *dexterity*; to which word they annex no other idea than that of quickness. This has produced a most absurd custom of measuring the motion of a surgeon's hand as jockeys do that of a horse's feet—by a stop-watch; a practice which, though it may perhaps have been encouraged by operators themselves, must have been productive of most mischievous consequences. *Tute et celcriter* are both very proper characteristics of a good surgical operation; but *tute* stands, as it should do, in the first place; as the patient who suffers the smallest injury from the hurry of his operator has no recompense from the reputation which the latter obtains from the bystanders. In most of the capital operations unforeseen circumstances will sometimes occur, and must be attended to, and he who, without giving unnecessary pain from delay, finishes what he has to do in the most perfect manner, and the most likely to conduce to his patient's safety, is the best operator."³

"... We may, in some desperate cases, have recourse to

¹ Vol. ii. p. 139 *seq.* The reference here, and in all subsequent instances, [is to the 1808 edition of "Pott's Collected Works," edited by Earle.

² Vol. i. p. 220.

³ Vol. i. p. 221.

such means as have been supposed to be either impracticable or unwarrantable. A surgeon should ever be cautious, but ill-grounded apprehensions will necessarily prevent improvements, and hinder us in some cases from attempting what may prove beneficial to mankind. Had every successor to Hippocrates been of his opinion, the operation of lithotomy had never arrived at its present state of perfection, and mankind had been suffered to languish under, and be destroyed by, a most tedious as well as excruciating malady.”¹

“A particular operation *may* not be successful, but desperation cannot be submitted to while there is the most extreme degree of *probability* of its being serviceable.”²

“To labour under a troublesome disorder, perhaps in the most joyous and active part of life, is very disagreeable; to be told that a palliative cure is all that can reasonably be expected gives small comfort, and renders the insinuation that the regular professors of surgery do not understand the proper treatment of this disease credible, or at least makes it be believed, *quod volumus facile credimus*. Ignorance of the true nature of the disorder, with a strong desire to be well on the side of the patient, and bold plausible promises on the part of the pretender, encourage the delusion, till time and the continuance of the malady prove the fraud, which few are found ingenuous enough to own. Whether it proceeds from a false bashfulness, which makes a man ashamed of acknowledging that he has been imposed upon, from a desire merely to conceal the disorder, from a pleasure arising from seeing others deceived as well as themselves, or from a much worse cause than either of these, I know not, but it happens not very infrequently that the patient, though perfectly undeceived, and convinced of the imposition, concurs in propagating the delusion, and asserts that he has received a cure, which he knows he has not.”³

These few extracts, culled from Pott’s writings, are given to indicate the general lines along which his chief advances were made. In one other direction, however, we notice that his efforts at improvement met with marked success in the principles of *bandaging*. Before Pott’s time bandaging partook of the general severity of surgical methods. He recommended and adopted a new style of things, which permitted both of more comfort to the patient and more chance of recovery. In dealing

¹ Vol. i. p. 159 seq.

² Vol. i. p. 193.

³ Vol. ii. p. 33 seq.

with fractures of the skull, Pott suggests that the dressings be "light and soft," and applied differently from the wonted manner of covering head-wounds. He condemns all those bandages, and the fitting of them, which were neat and elegant on paper, but when practically used were inconvenient, pressed and heated the head, and confined it in an awkward position. "All that can possibly be wanted in these cases is merely to keep the dressings in their place without any degree of pressure or confinement, and this purpose will always be better accomplished by a loose cotton or yarn nightcap than by the nicest and most elaborate bandage that was ever invented."¹

This advocacy of the disuse of superfluous bandages was the birth of a new era also in the treatment of fractured limbs. Pott's improvements in these cases, as well as his modifications of the *positions* of the injured limbs during and after setting, are too well known to need description.² Similar improvements were advanced in the application of trusses in cases of rupture.³

Among the many advances in surgical knowledge, pure and simple, which we owe to Pott, Earle reckons the greatest as being his treatment of fistulous sores, and the history which he left us of diseases producing caries of the bodies of the vertebræ, and the means of cure in each case. The name "*Pott's disease*" is given to this last malady in honour of its first observer. Pott's name is also well known in relation to two other diseases, the "*puffy swelling*" of the head, first adequately described by him, and "*Pott's fracture*," fracture of the lower third of the fibula, accompanied by outward displacement of the foot. It was in connection with this particular kind of fracture that Pott made his new method of bandaging and support of the limb so successful. In the address already alluded to, Mr. Butlin illustrated practically how fractured limbs were wont to be treated previous to Pott's day, using a multiplication of splints, rollers, and bandages, which, together with the accompanying pressure produced, conspired to bring about all the bad results that could possibly be wished *not* to follow. Pott also urged how unnecessary was the continual *moving* of a leg with simple fracture, in opposition to the older school of surgeons.

For some time Pott was reckoned the most distinguished surgeon of his day. He was consulted by persons of the highest rank, and this preference, assisted doubtless by his naturally somewhat lofty bearing, drew upon him the reproach of finding no time to attend to, or spare any of his talent upon, the poor. The imputation was unjust in the extreme, for a

¹ Vol. i. p. 172 seq.² Vol. i. p. 300 seq.³ Vol. ii. pp. 65, 101, &c.

mere perusal of the great number of recorded cases in which he was so successful shows that the poorer section of the community derived much benefit from his genius. Nor could a better refutation of this charge be offered than the fact that at the time of which we speak there was a good deal of outcry against the "wholesale charity" which the growth of large hospitals provided. In a curious old tract,¹ a copy of which may be seen in the British Museum, published in 1752, the writer endeavours to show that the poor and mechanic classes of London were being assisted in the matter of surgical and medical aid to such a degree that they were in danger of becoming indolent and reckless, "having no charges on account of sickness and accident. For while they themselves, their wives and children, could be provided for in case of sickness, and their wives taken care of in their lying-in, they would only work just so much as was necessary for their subsistence and indulgence in eating and drinking, scarce having cloaths to their backs."

Pott's contemporaries at his own Hospital—St. Bartholomew's—were Edward Nourse, Stafford Crane, R. Young, Edmund Pitt, and Sir James Earle. Dr. William Pitcairn, and later Dr. David Pitcairn, were doing great work in the medical wards. The former was elected Physician the same year that Pott was elected Surgeon (1749). His contemporaries outside the Hospital included Sharpe, Thompson, Harrison, Petty, Sir William Blizard, Neale, Else, and Cline. He was succeeded at St. Bartholomew's by Mr. (afterwards Sir) Charles Blicke, to whom Abernethy had been apprenticed eight years previously.

We lastly consider Pott as a *writer*, and we have already had an opportunity of judging of his qualifications for literary tasks. His books are composed with a scholarly grace and elegance that are rarely to be found in works of such an essentially technical nature. His wide acquaintance both with classical authors and the best writers on surgery and anatomy before him, reveals itself in the productions of his own pen, which are often delightful reading, even at the close of a century which has passed since they were written. His general treatment of his subjects deserves great praise. The admirably lucid divisions which he gives, and the pains he takes to make the record of his observations as faithful as possible without being too prolix and minute—and therefore tedious—are distinctive features in his books. His general style has become apparent from the extracts already quoted. The few that follow are

¹ "The State of Surgery: but more particularly the Disadvantages its Professors lie under, considered."

specially *general* in their bearing, and serve to show how free from any trace of triviality his efforts at advancing the interests of his profession were.

"Caution and fear are different things; where any good can be done, it ought to be attempted by every practicable and justifiable means; but where no good is reasonably to be expected, there is no warrant for doing anything."¹

"*Ne occidisse nisi servasset* is, under certain limitations, a very just and prudent maxim, but taken at large may be productive of much mischief. Mankind are rather too apt to form their opinion from events only; success with many constitutes propriety, and the failure of it is often very unjustly set to the account of misconduct, or of want of knowledge. A young practitioner at a distance from assistance, and thereby deprived of that support, may be afraid to put his character to hazard by acting in such a manner, as although it might justly entitle him to success, yet cannot command it. He may understand his art, but art is not infallible. He may be a very excellent surgeon, and yet be afraid to encounter the prejudices of some, or the malevolence of others."²

"The boast of universal specifics, of remedies infallibly preventative of disease, and of means whereby chirurgical operations may be rendered totally unnecessary, is the language of quackery, and not of science."³

"More censure is incurred by an unguarded prognostic than by a successful event, if properly and judiciously foretold; and if a man were to form his judgment upon this and some other hazardous disorders"—speaking of ruptures—"from books only, he would expect very little of that trouble and disappointment which he will most certainly meet with in practice. . . . To say the truth, the hazard is so great, and the utmost power of art so little, that what Iapis said to Æneas with relation to his cure may with great propriety be said here—

'Non hæc humanis opibus, non arte magistra
Proveniunt; neque te Ænea mea dextra servat:
Major agit Deus.'⁴

"Truth, as Lord Bacon has said, is not the child of authority, but of time. And were we to allow ourselves to suppose (let

¹ Vol. i. p. 196.

² Vol. ii. p. 203 *seq.*

³ Vol. ii. p. 202.

⁴ Vol. ii. p. 102.

the subject be what it may) that nothing more or new could be taught, it is pretty plain that nothing more or new would be learned.”¹

“The business of good surgery is to assist nature; but she will sometimes get the better even of the worst—

‘Usque recurret,
Et mala perrumpet furtim fastidia victrix.’”²

To complete our short sketch of Pott’s life and work, it merely remains for us to give a brief survey of his literary productions so far as they concern the science and art of surgery. Surgery, like all other branches of science, is progressive; it is thus that, read in the light of our knowledge of anatomy and operative treatment to-day, Pott’s works necessarily appear crude and incomplete. The presence of actual errors is, of course, not wanting, though these are much fewer than might have been supposed. But as an epoch in the evolution of surgery, Pott’s productions stand unexcelled for their originality and decided advance upon previous ideas.

In the following short synopsis of Pott’s books we shall deal especially with those points which are seen to be landmarks of progress, and influential as helping to form no small part of the bulk of present-day knowledge upon the matters discussed.

The general survey of Pott and his work may perhaps not inappropriately conclude (as it commenced) by a few of his own words, revealing as they do so well the character of the true surgeon, and typical of his own long life of strenuous and unflagging labour for the good of mankind:—“Many and great are the improvements which the chirurgic art has received within the last fifty years; and much thanks are due to those who have contributed to them; but when we reflect how much still remains to be done, it should rather excite our industry than inflame our vanity.

“Our fathers thought themselves a great deal nearer to perfection than we have found them to be; and I am much mistaken if our successors do not, in more instances than one, wonder both at our inattention and our ignorance. Notwithstanding all our late real improvements, there is still ample room to exercise all the powers of many succeeding artists, and to furnish them with large opportunity of acquiring honour to themselves, and of doing much praiseworthy service to mankind; the art is still defective, and the words of Seneca are

¹ Vol. iii. p. 43.

² Vol. iii. p. 73.

still, in some degree, as true as when he wrote them, '*Multum adhuc restat operis, multumque restabit; nec ulli nato post mille secula præcludetur occasio aliquid adhuc adjiciendi.*'"¹

IV. SYNOPSIS OF WORKS.

1. *An Account of Tumours which rendered the Bones Soft.*² Communicated to the Royal Society by Mr. Pott, surgeon, in November 1740.—This is a case of a man aged 27, who had an encysted tumour lying loose between the sartorius and vastus internus muscles. It was removed, and the patient was well in six weeks, continuing so for a year. Then pain and drowsiness set in, the former increasing, till, though many remedies were tried, complications followed, involving the hip-joint and inguinal glands. He died three years after the operation. On opening the tumour which had been removed, it was found ossified. At the post-mortem a large tumour was found on the sternum containing bony particles in large number. The original sternum beneath was absent, having been quite absorbed, as were also parts of the adjoining ribs. As many as thirty-seven smaller pieces were found in the thorax, attached to the vertebræ, which also had their cortex absorbed. Other parts of the skeleton, in the pelvic girdle and limbs, were similarly affected. One tumour was found within the orbit, pressing on the optic nerve.

2. *An Account of a Hernia of the Urinary Bladder including a Stone.* By Mr. Pott, F.R.S. Communicated February 16, 1764.—This occurred in an otherwise healthy boy of 5 years, and did not become troublesome until he was 13, when an operation was performed, which resulted in a permanent cure, and the urine passed out through the urethra in a normal manner.

3. *Cure of Hydrocele by a Seton.*—This was an appendix to Pott's larger work on "The Hydrocele." In it he describes a new form of trochar of his own invention.

4. *Fistula in Ano.*—This account of a disease at the time very little understood assisted largely to modify the older forms of treatment. Pott had introduced a new cure, depending upon (1) whether the intestine was or (2) was not interested or perforated. He deprecated the use of caustic as a cure, and

¹ Vol. iii. p. 137.

² For the order in which these publications appeared, *vide supra*.

advised a simple incision in order to discharge the abscess. His whole treatment of fistulous sores was entirely new, and he laid the foundation of the mode of procedure at present in vogue for this form of disease.

5. *Injuries to the Head from External Violence*.—This is an exceedingly comprehensive work, and from its great importance as an admirable classification and historical account of these wounds of the scalp and cranium, deserves rather fuller analysis.

Section I. deals with lacerated wounds of the scalp. In it Pott advocates the preservation of any part of the scalp which may have become detached, whenever this is possible. Union may often be procured, even though the cranium be perfectly denuded by the accident.

Section II. Effects of contusion on the dura mater and parts within the skull. Pott exposes the error of supposing that extravasated blood always gives rise to pus. He believes that the matter found on the dura mater after contusions of the head never was mere blood, this being borne out by all his observations. He shows the fallacy of the French surgeons' division of head contusions into (1) *primitive*, attributed to extravasated blood, and (2) *secondary*, attributed to putrefaction. The two kinds of symptoms differ in *cause*. Then follows the detailed description of the "puffy swelling" to which the author's name has long since been given, with an explanation of its origin and cause.

"A puffy circumscribed tumour of the scalp, and a spontaneous separation of the pericranium from the skull under such tumour . . . are almost infallible indications of an inflamed dura mater, and pus either formed or forming between it and the cranium."

He then proceeds to correct the false notions that had prevailed for some time that the dura mater was only adherent to the cranium along the lines of the sutures.¹ Pott advocated *phlebotomy* very largely for cranial wounds; indeed, blood-letting was always greatly recommended by Pott—the decline of *that* mode of weakening nature was reserved for a later generation than his.

Section III. deals with separation or destruction of both tables of the skull from contusion. Here is discussed the use of mercurials, and a timely warning is uttered against the practice, so liable to be carried to excess: "Persistence in the use of mercurials has cost many a man his life by aggravating

¹ Ancient writers do not make this mistake, but it had crept into later works.

and continuing that symptomatic fever which it should be the whole business of the art to calm and temperate."

Section IV. deals with fissures and fractures of the cranium without depression, under two general heads:—(1) The broken parts keep their proper level; (2) They do not. The *symptoms of fracture* as taught by Celsus are discussed, and it is shown that these are not produced by the breach, but proceed from injuries done to the brain, independent in most cases of any ill to the bones. Pott also discusses the use of the "trepan" in these cases, showing that the object is *not* to obtain union, but merely to discharge matter. He proceeds to make clear the only possible reasons for "trepanning." Pott's conclusions are that

A. (1) Uncovering the dura mater is attended with great mischief, and

(2) Simple fractures are curable without it. But also that

B. Inflammation of the dura mater is *bound* to follow, producing a collection of matter and fever.

He proceeds to show that A (1) is only sometimes true, and this is not sufficient reason for obtaining any general rule of conduct. He then details the considerations which should be weighed in any particular case, and gives his reasons for *early use of the trephine*. This he very strongly recommends, concluding that the general rule of perforating the skull in all cases is a good one. But he is careful to back up this statement by a consideration of all the facts known to him, and takes great precautions against being misunderstood in this matter, as in that of exposing the dura mater. Next follows a lucid account of the several historical methods of treatment, with a detailed description of the instruments used. To this we have incidentally alluded in the general part of this essay, mentioning that it is largely due to Pott that the complexity and multiplicity of instruments has given place to simpler forms and fewer. Detailed instructions follow, with an enumeration of the hazards to be guarded against in the operation. The fracture must be carefully distinguished from (1) a suture and (2) the sulcus of a blood-vessel. Means for avoiding these errors are given, and signs of inflammation of the dura mater.

This section, as all the rest, is completed by the detailed description of typical cases illustrative of the matter under discussion.

Section V. treats of fractures of the cranium with depression. Here the intentions must be the same as previously, but must go farther. The ancients spoilt their correct intentions by the

crudeness of their tools and the bad methods of fixing them. Now only the trephine and an elevator are required. An account of the most appropriate dressings and bandages follows, and we have already touched upon Pott's services in this connection.

Section VI. deals with extravasation and "commotion." These are very distinct causes of mischief, though not always very distinguishable. Pott again advocates perforation for the effusion of blood or other fluid, though this view was opposed by Morgagni and others.

6. *Observations on that Disorder of the Corner of the Eye commonly called Fistula Lachrymalis.*—This again is a very exhaustive treatise, and is divided into the following sections.

Section I. deals with the anatomy and physiology of the parts concerned. Pott corrects the error of supposing that the caruncle secretes the lachrymal fluid, and that this is of a noxious nature. This correction had been made before the author's time, but needed reiteration to prevent misinterpreting the nature of the disease. Many of the methods of cure then in vogue failed miserably, because it was not recognised that the sole cause of the malady lay in an obstruction to the passage of the tears down the nasal duct.

In Section II. a true description of the parts is given, and contrasted with the historical account of Section I.

Section III. states the variations in appearance of the disease, which are due to the (1) Degree of obstruction of the duct; (2) State of the membrane covering the sac; (3) State of the sac itself; (4) State of the underlying bone; (5) General state of the patient.

Then follow some very instructive general remarks upon the nature of *pus*, and its relation to, and difference from, *mucus*; also upon the necessity of not confusing the two substances.

Section IV. states under four heads the possible appearances of the disease:—

(1.) Simple dilatation of the sacculæ, and obstruction of the duct. The mucus is clear, or only just cloudy.

(2.) The tumour is larger, the skin inflamed but entire, and the mucus yellow.

(3.) The skin is sloughy and burst, the swelling therefore lessened, and the mucus now discharges itself through the new aperture.

(4.) The nasal passage is totally obliterated.

Treatment is next discussed, and the passage of a probe is not advised, because of resulting inflammatory mischief. A

syringe, if judiciously used, is very serviceable in Case (1). The author begs "leave to suspend his assent to the general use of probes" in this disease, or "even to their frequent practicability." Here we note, as in many other cases, Pott's solicitude to avoid being thought to depreciate the value of any operation which was not of his own introduction, or in which he was not successful. But he insists that the simple state of the disease needs "no surgery at all."

Section V. treats of the more complicated forms of the malady. Even here the advice is, Do as much as possible without the use of probes. Previous dilatation of the sacculæ is often very useful. The use of "escharotic medicines" by the older surgeons was due to their misconception of the cause of the disease, thinking it to be an abscess. With regard to these remedies Pott says: "This is one of the several instances still remaining of our adhering to old methods of practice, after the principles on which such methods were originally formed have been allowed to be erroneous." There is no need for the use of corrosive applications of any kind.

Section VI. deals with those cases where the nasal duct is obliterated, and the bones have become carious. Hot iron applications are unnecessary for many reasons, though "the late Mr. Cheselden" is quoted as having been a warm patron of the cautery. Many instruments are available for the purpose in hand, the only necessary caution being to apply them so as to pierce that part of the bone lying immediately behind the sacculæ, not pushing it too far, and thus injuring the spongy turbinated bone. Pott agrees that this perforation is necessary, and he always used the "curved trochar" for the purpose. Directions follow as to dressing and cleansing the parts.

7. *Treatise on Ruptures.*—This work is certainly one of Pott's greatest. It is in thirteen sections, and describes very fully the anatomy and surgery of the subject. We have already given several extracts from it; but the surgical interest of the book is not so great as it was, since the succeeding labours of Sir Astley Cooper and Sir William Lawrence in the same field have superseded Pott's. At the time it was published its great value lay in the attention given to a thorough knowledge of the anatomy of the various regions interested, and in the refutation of the older forms of treatment. The work is illustrated by many actual cases, some of which are very interesting. Herniæ of the liver, spleen, ovary, bladder, &c., are amongst those described.

In Section X. an account is given of *congenital hernia*, the

discovery of which is probably due to Pott himself, although John Hunter claims a precedence in the matter.

8. The work on *Dislocations*, though termed "a few remarks," is really a full account of limb fractures and their treatment. It includes a description of that fracture of the fibula known as "Pott's fracture."

9. *On the Hydrocele*: the title of a book dealing not solely with this disease but with many others affecting the testicles and their coverings. The nomenclature is settled, the anatomy of the parts fully gone into, and modes of treatment in special cases described.

10. *Palsy following a certain form of Spinal Curvature*.—In one particular this is perhaps the most important of all Pott's writings, for it contains the very lucid description of the so-called "Pott's disease" of the vertebræ. This is too well known to need recapitulation.

11. *Observations relative to Cataract, Polypus, Scrotal Cancer, and Mortification of the Toes and Feet*.—This contains many contributions to our knowledge on the subjects, although modern surgery, in each case, has advanced very considerably beyond Pott's methods of treatment.

12. *Remarks on the Necessity of Amputating in Special Cases* gives many valuable generalisations upon the subject. The introduction of anæsthetics, however, and the invention of new forms of operating, render the deductions rather less reliable than when they were advanced.

13. About the year 1810 was published a small monograph containing *Observations on Cancer in Chimney-Sweepers*. This was the only manuscript relating to surgery left by Pott, an evidence of his careful consideration for the advancement of his art, for the leaving behind of unpublished and crude manuscripts is too often seen to be an injudicious procedure when they see the light as posthumous publications.

For the extracts on pp. 167–8, as also for several corrections and suggestions in connection with Section II. of this Essay as revised for publication, my best thanks are due to Mr. D'Arcy Power, whose kindness in the matter I am anxious to acknowledge here.

NOTE ON HYDROXYLAMINE HYDROCHLORATE

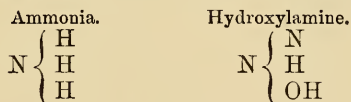
AS A SUBSTITUTE FOR NITRITE OF AMYL OR NITROGLYCERINE.

BY

T. LAUDER BRUNTON, M.D., F.R.S.

The pain of angina pectoris is usually quickly relieved by amyl nitrite, isobutyl nitrite, other nitrites, and by nitroglycerine. All these substances quickly lower blood pressure and lessen cardiac pain, but their effect also passes off quickly, and a remedy which will have a similar but more lasting action is still a desideratum. Hydroxylamine hydrochlorate may to some extent supply this want, though not so fully as one could wish.

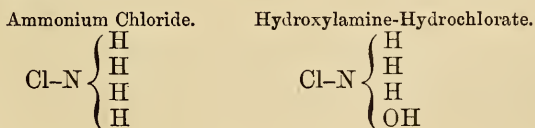
Hydroxylamine is nearly allied in chemical constitution to ammonia, being ammonia in which one item of hydrogen (H) is replaced by one of hydroxyl (HO) thus—



Hydroxylamine is hardly if at all known in a free state, but only in aqueous solution as salts.

The hydrochlorate is the most common salt. It is prepared from sodium nitrite. It is unnecessary to give here the mode of preparation, but it is described by Bernhard Fisher in "Die Neueren Arzneimittel," 5th edit., p. 14.

Hydroxylamine hydrochlorate corresponds in composition to ammonia hydrochlorate, or ammonium chloride, as it is more commonly termed.



It forms colourless crystals resembling those of ammonium chloride. It is soluble in one part of water and in fifteen of alcohol. It is also soluble in glycerine.

Action.—Hydroxylamine was discovered in 1865 by Lossen, but it was only made commercially by a process discovered by Raschig in 1887.

Raimondi and Bertoni¹ found that it converted the hæmoglobin of the blood into methæmoglobin, and Loew² that it is a powerful protoplasmic poison. It is consequently powerfully antiseptic. Binz³ found that it acts as a narcotic, appearing to paralyse the sensory centres while leaving the motor powers unaffected. Ammonium chloride, on the other hand, has but

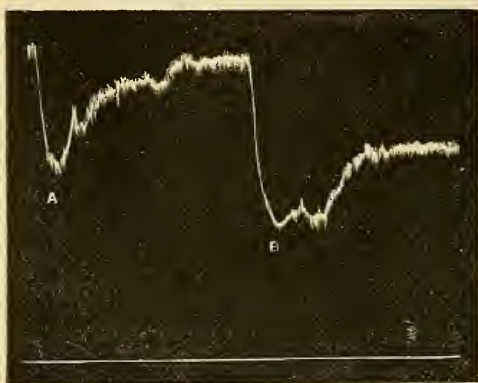
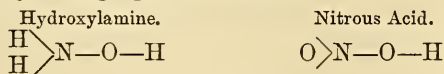


FIG. 1.—A shows the action of mixed pure α and β amyl nitrites, and B of commercial amyl nitrite on the blood pressure of a cat.

little action on the sensory centres, but causes convulsions and paralysis.

Hydroxylamine was thought by Raimondi and Bertoni to be converted in the blood into nitrous acid, and Binz obtained the reaction of nitrites from the blood of animals poisoned by it.

The relationship of hydroxylamine to nitrous acid is seen from the subjoined graphic formula—



From its relationship to nitrous acid it seemed *a priori* probable that hydroxylamine would lower the blood pressure in the same way as the nitrites and nitroglycerine.

¹ Raimondi and Bertoni, *Ann. universali di Med.*, 1882, Bd. 259, p. 97.

² Loew, *Pflüger's Archiv*, 1885, Bd. 35, p. 516.

³ Binz, *Virchow's Archiv*, 1888, Bd. 113.

On trying this experimentally, my assistant, Mr. T. J. Bokenham, and I found¹ that the fall of pressure caused by the injection of hydrochlorate of hydroxylamine, either into the veins or peritoneal cavity of an animal, caused a fall of blood pressure so like that due to nitrite of amyl, that it is impossible to tell from tracings taken by a recording apparatus which fall is due to hydroxylamine and which to nitrite of amyl.

From this action it seemed probable that hydroxylamine might be useful as a remedy in angina pectoris, and, on trying it, I have found it to be so.

It has been used externally in one-fifth to one-half per cent. solutions as a remedy for psoriasis, but, so far as I am aware, the following case is the first in which it has been used internally, although nearly five years have elapsed since we showed its power to reduce blood pressure.

F. T. P., æt. 42, hammerman, admitted to Mark Ward August 28, 1894. Had rheumatic fever five years ago, and three other attacks since, the last being in April 1894. For the last two years he has been prevented from following his occupation on account of its occasioning pain in his chest, passing round to the left side through to the back and down the left arm.

Condition on admission: He is well developed; his complexion is pale; his face has an expression of distress; and his eyes of pain; he talks with a husky and almost aphonic voice; his tongue is flabby, indented at the edges, dirty on the dorsum. Temperature, subnormal; respirations, 44; pulse, 72, regular, rather jerky, easily obliterated. The radial artery is a little thickened, not atheromatous. The right radial pulse at times is stronger than the left.

Chest: Movement over the precordium is more obvious than elsewhere; marked suprasternal pulsation; cardiac impulse in the fifth interspace, and one inch outside the nipple; impulse obvious, but not heaving: no thrill over the precordium; dulness extends upwards to the third space and to the right border of



FIG. 2.—Tracing showing the effect of hydroxylamine hydrochlorate on blood pressure. At the point marked by a * 3 minims of one per cent. solution of hydroxylamine hydrochlorate were injected into the jugular vein of a cat weighing 6½ lbs., and anaesthetised with ether. The lower line indicates the zero of pressure.

¹ Lauder Brunton and Bokenham, *Proc. Roy. Soc.*, Feb. 1889, vol. xlv. p. 252.

the sternum; at the apex both sounds are audible; the second is accentuated, but there is no murmur. At the aortic cartilage the first sound is replaced by a to and fro murmur; the second is accentuated; no friction. There is pain at the site of the impulse and in the left side.

Lungs: Percussion good; air enters freely all over. Some dry crepitant râles at the base on making the patient sit up. Vesicular murmur rather coarse. For the last five years he has been liable to sudden attacks of abdominal pain, worst when the bowels are confined, and relieved by the bowels being open three or four times. The liver extends 1—2 finger-breadths below the ribs. The vocal cords are thickened. The left is somewhat congested, and hardly moves so well as the right.

Treatment.—Complete rest in bed and pot. iodid gr. xv., ammon. carb. gr. v., aquam ad ʒi. ter die, sum. pil. col. c. hyoscyam. gr. x. pro re nata.

August 31.—Ordered tabell. nitroglycerini B.P. pro re nata to relieve the anginal pain.

September 3.—Pot. iod. increased to gr. xx. ter die.

September 5.—He has had in the course of the day three or four attacks of cardiac pain passing down the left arm—relieved by the nitroglycerine tabloids. He has also had pain low down in the left axilla, and a dry rub is audible at this place. A linseed poultice was applied. The friction came and went for a few days and then disappeared. The laryngeal congestion lessened under the use of creosote vapour.

September 23.—Ordered 1 gr. of hydroxylamine hydrochlorate dissolved in an ounce of water, to be taken when the pain comes on.

September 24.—Has had recurrence of pain in the left arm, relieved by hydroxylamine. Abdominal pains have recently been more frequent.

September 29.—Pain referred to right side of thorax at base of lung, and here low down in the axilla and at the angle of the scapula there is friction with impaired percussion and diminished air entry. Low down in the left axilla there is also friction. The cardiac impulse is now half an inch outside nipple in the fifth space. The first sound here is replaced by an indefinite murmur. The second sound is accentuated at the aortic cartilage where a muffled to and fro murmur is heard.

October 7.—For the past few days he has had some diarrhoea but is better now. Yesterday morning he had an attack of precordial pain. A dose of hydroxylamine was given. It relieved the pain. In the afternoon the pulse was 72, regular,

feeble, and soft. The heart sounds were feeble, and the only murmur audible was a faint diastolic murmur about the pulmonary cartilage. To-day the pulse was stronger, but had not regained its former state.

October 8.—Cardiac impulse barely perceptible. Sounds faint. Pain less. Bowels open twice.

October 13.—More precordial pain. Hydroxylamine given.

October 15.—Less pain.

Discharged October 19.

In the case of this hammerman the lesion was almost certainly aortic dilatation, perhaps not amounting to a sacculated aneurysm, with some obstruction and some regurgitation. The original pains were probably due to the hypertrophied heart being imperfectly supplied with blood by diseased coronary arteries; but I have discussed the mechanism of cardiac pain elsewhere, and need not enter at length upon it again. The pain was relieved both by nitroglycerine and by hydroxylamine. In the opinion of the House-Physician, Dr. Horne, the relief afforded by the hydroxylamine was of somewhat longer duration than that given by nitroglycerine. On the other hand, it is not quite certain that the hydroxylamine did not cause a certain amount of intestinal irritation, as the abdominal pains from which the patient frequently suffered at all times were perhaps a little more frequent when taking the hydroxylamine.

In some cases where I have tried this remedy in out-patients, I think I have also noticed some intestinal irritation, though not by any means in all. In all or nearly all the out-patients in whom I have tried it for the relief of anginal pains, it has relieved the pain; but as it is much more difficult to obtain accurate notes of out-patients, I have not given them at length.

From the trials I have made of hydroxylamine in disease, I have come to the following conclusions:—

1. The physiological action of nitrites,¹ of nitroglycerine,² and of hydroxylamine³ is alike, as I have already shown, and they all have the power of greatly lowering the blood pressure by dilating the peripheral vessels.

2. That hydroxylamine, as was to be expected from its physiological action, has a similar power of relieving pain in angina pectoris to nitrites and nitroglycerine.

¹ Lauder Brunton, *Arbeiten a. d. Physiol. Inst. zu Leipzig*, 1869, and *Journ. of Anat. and Physiol.*, vol. v. p. 92.

² Lauder Brunton and Tait, *St. Bartholomew's Hosp. Rep.*, 1876, vol. xii. p. 140.

³ Lauder Brunton and Bokenham, *Proc. Roy. Soc.*, 1889, vol. xlv. p. 352.

3. It may be employed in disease as a substitute for them.
4. Its action appears to last longer than that of nitroglycerine, and *a fortiori* longer than that of the nitrites of amyl, propyl, or butyl.
5. In some cases it may have a local irritant action on the gastro-intestinal tract. To avoid this it should be diluted.

NOTES ON A CASE OF FUGITIVE ŒDEMA OF OBSCURE ORIGIN, ENDING FATALLY.

BY

W. J. HORNE, M.B.

Through the kindness of Dr. Church, I am able to report a case that was admitted to Faith Ward last summer. The case presented difficulties both as regards the diagnosis of the disease and also as to the cause of death—difficulties which the autopsy has so far failed to explain. I have therefore appended the notes at length, adding perhaps much that may or may not be of importance, thinking it would be better to incur the risk of being tedious than to allow the facts themselves to become so distorted by omissions as to be valueless to others.

Agnes H., æt. 13, was admitted to Faith Ward on May 19, 1894. The mother informed me that since August 1892 the child had complained from time to time, latterly more constantly, of pain in the limbs, which had not been particularly referred to the joints. Through pain and weakness she had been unable at times to stand or sit up, and in consequence had been laid up at intervals for three or four days, but had seldom been obliged to keep to her bed for an entire day. The mother had noticed transient attacks of œdema about the face, and in the neighbourhood of the elbows, wrists, and knees, with a rosy mottling of the skin over the parts œdematous. This mottling had been more persistent than the œdema, and similar to that present on admission. These attacks continued through the winter of 1892-93. In the summer of 1893 she recovered a little, and went through last winter without much complaint or pain.

Three weeks previous to admission the knees and elbows became swollen and painful, and localised swellings of the arms and face followed; but during the three weeks she had not been compelled to keep in bed for more than a day or two at a time. The child walked up to the Hospital, and about the ward

on admission. From the mother's account I gathered that there had been no definite joint pain, no pyrexia nor sweating; nor had there been any gastro-intestinal disturbance—the bowels usually opened once in two days; and no affection of the throat or breathing had been noticed.

The previous history showed that in infancy the child had had scarlet fever and measles.

The family history was that the patient was the fourth of eight children; the others were alive, and none had suffered in a similar way.

On admission, the face was characterised by the blunt features, by an asymmetrical cedema of the forehead—more obvious over the left orbit, but sparing the eyelids—by a thickening of the tip of the nose and the upper lip, and by the rounded jowls. An erythematous mottling was irregularly distributed over the forehead, cheeks, temples, and chin, but not extending beyond the submaxillary regions. The erythema was bright in places, rosy to dull elsewhere, with edges here sharp and there fading, but not raised. The skin appeared natural in texture—no wrinkling nor itching. The lips were anæmic; the tongue big, flabby, smooth, and clean, but pallid; the teeth a bad colour, the edges chipped and notched, but not “pegged.” The neck was thick, but free from cedema and erythema, and it was difficult to estimate the condition of the thyroid gland; no abnormal condition was noted.

The chest was narrow, and the trunk long and out of proportion to the limbs; there was no evidence of past rickets. The mammae were ill developed, the glands practically absent, the nipples withered, what was left of them being merely dry and cracked warty excrescences. The movements of the chest were natural. Respirations 20, and quiet. Nothing abnormal was detected in the lungs. The heart's impulse was obvious in the fifth interspace, an inch inside the mid-clavicular line; no thrill, dulness normal in extent, the sounds pure, and no murmur. The pulse was 108, regular, and of fair volume; at the right radial it seemed small, perhaps accounted for by being felt through altered and infiltrated superjacent tissue.

Abdomen: The walls were free from cedema and erythema; the skin was more pigmented than usual. No viscus was abnormally felt. No ascites was made out. The catamenia had not commenced.

The joints were all free from swelling, heat, pain, or tenderness, but the elbows could not be completely extended, more particularly so the right, which could not be extended beyond a right angle. No thickening was felt about any of the joints.

Bright and well-defined patches of erythema, about an inch long and slightly papular, were noticeable over the olecrana and patellæ.

Œdema was present over the right arm and the supinator surfaces of both forearms, pitting deeply upon firm and prolonged pressure, the right forearm being more œdematous than the left. The dorsum of the right hand was also œdematous, and pitted more readily than the arm; the left hand was free from œdema.

The skin appeared natural in texture, the œdema lying in the deeper parts; a faint erythema was noticeable over the parts of the right forearm and hand that were œdematous.

The legs were free from œdema and erythema. Over the upper and inner part of the left tibia a hard nodule of the size of a broad bean could be felt, freely movable beneath the skin.

The child was unable to sit up in bed for long at a time on account of fatigue and pain occasioned in the lumbar region in attempting to do so. There was no œdema of the back, and no abnormal condition of the column. No motor-impairment, anæsthesia, or hyperæsthesia.

The lymphatic glands could be felt enlarged at the condyles of the jaw, in the occipital and submaxillary regions, and also in the axillæ. The inguinal glands were not enlarged. Deeply seated in the back of the calves, arranged along the course of the veins, small flattened nodules were felt (? glands); they were not tender, nor was the skin over them reddened. No erythema nodosum was present.

The tonsils were a little enlarged, but no symptoms were referred to the throat.

Larynx: The normal contour of the posterior half of the larynx was partially lost by slight œdema of the ary-tænoids, inter-ary-tænoid tissue, and the posterior third of the ary-epiglottic fold. The epiglottis was natural, the movements of the cords good, and there was no endo-laryngeal disease.

The general nutrition was not very good, and her disposition was one of placid indifference and languor. Temperature was 97.4°. The urine was clear, acid, sp. gr. 1015; it contained a trace of albumen, and with liquor potassæ and picric acid it yielded the same reaction, but not so quickly as when sugar is present. No sugar was indicated by Pavy's test. An examination of the blood with Gower's hæmacytometer gave an average of thirty-nine red corpuscles and one white to a square. No changed corpuscles were present.

The œdema of the forehead, which on the morning of admission had been more marked over the left orbit, by the afternoon

had increased, and had become more noticeable over the right orbit, the eyelids remaining free.

The following day the œdema of the right arm, of both forearms, and the dorsum of the right hand had somewhat subsided. But on the 23rd the forearms in their upper third could again be easily made to pit; the forehead was less œdematous, whilst the upper lip was more thickened.

A week later, May 30th, the erythema of the face was of a brighter tint, and the puffiness more marked; the eyelids were not involved, but the rest of the face was more thickened and swollen. The œdema of the forearms had continued, and it did not appear to be determined by position. The tonsils were more enlarged, and deglutition had become difficult. The pulse had quickened to 128. The temperature up to now had been running a normal course.

From June 1st the œdema of the upper extremities commenced to subside, and by the 6th the left forearm could not be made to pit, and the right only slightly. The œdema had migrated; pitting was obtained across the upper part of the front of the thorax and down the sternum. The facial œdema and mottling had not subsided. The bright patches of erythema noticed on admission over the olecrana and patellæ had faded a little.

June 6th, four minims of liq. arsenicalis were ordered thrice a day.

The temperature up to June 6th had kept a normal course; it then began to steadily rise, and by the 10th reached 101.2°. The face had become more œdematous and more deeply mottled. More of the occipital glands could be felt enlarged; bending the head forward occasioned pain. The pulse had further quickened to 140. The cardiac impulse had become displaced half an inch outside the mid-clavicular line. A soft systolic murmur was audible, loudest over the pulmonary base, diminishing towards the impulse, and inaudible behind at the angle of the scapula. The child complained of the throat being sore and of nausea; there was no arthritis.

By June 12th the temperature had reached normal again. The pulse was not so strong, and the general condition weaker. The lips were dry, cracked, and bleeding a little; the tongue furred, the breath offensive, the eyes watering; the nausea continued, and food was being taken less readily. The arsenic was stopped, and salicylates (gr. x.) ordered in place of it. A firm œdema now occupied the lumbar region. The skin over the legs was becoming tense, and the left thigh and leg above the ankle could be made to pit. This œdema, first noticed in the

morning, rapidly increased, and by the afternoon both legs and thighs were cedematous and readily pitting. The ankles and feet were not only free from cedema, but were wasted, their bony landmarks being unusually obvious.

The following day, June 13th, there was no decrease of the cedema in the lower extremities; the inguinal glands were not enlarged. The face was even more cedematous and the mottling more intense, reaching on to the neck. The features had undergone an obvious change.

June 14th.—The respiration, previously quiet and natural, was quickened, noisy, and in the night at times difficult, breaking her sleep; there was no indication of laryngeal obstruction, and the sound was perhaps occasioned by the now much enlarged tonsils. The lungs yielded no morbid signs. The tongue was tremulous and more furred. The upper extremities had completely lost the cedema, and were left thin and wasted; the dorsal aspect of the fingers had a pinky red tinge. The cedema had also completely disappeared from the thorax; where seven days previously it had not been possible to count the ribs by palpation, it was now only too easy to do so by inspection. The legs were still cedematous, and the ankles, now involved, were swollen and painful, but not reddened nor tender. The superficial veins of the neck were unusually full, and the murmur at the pulmonary base loudly audible on pressure.

By June 16th the general condition had become more enfeebled; she was more helpless; pulse quicker and weaker; the thighs, legs, and ankles more cedematous than on the 14th. The thighs had become more cedematous before the legs, and the legs before the ankles. The left foot was more cedematous than the right. The cedema had not left the face, and the mottling persisted there and about the neck. The cedema over the lumbar region had increased; it was a loose fluid cedema, pitting readily with but slight pressure; the spinous processes, previously obvious from neck to sacrum, could not now be felt in the lumbar region without dipping deeply for them. The respirations were noisier and faucial. The voice was fairly strong—not brassy, but much rougher than on admission. The mouth could not be widely opened; the lips, owing to the thickening, were moved with difficulty; expectoration was not attempted, the saliva escaping over the angles of the mouth. The tonsils were much enlarged, meeting in the middle line. The larynx was pallid, the epiglottis normal in its outline and free from cedema. The ventricular bands were slightly cedematous, hiding the ventricles and partly overhanging the cords, but the cords moved equally and readily. There was more infiltration and

further obliteration of the normal contour of the arytaenoid and interarytaenoid region than on admission (four weeks previously); the cedema was not sufficient to materially affect respiration.

There was some cough. Percussion of the lungs behind gave a generally resonant note, but the vesicular murmur could not be distinguished from the noisy faucial sounds transmitted to the bases and drowning all other sounds.

June 17th.—At 3 A.M. the temperature rose to 104.6° and the respirations quickened to 56; by 11 A.M. the temperature had fallen to 101°, the pulse was 140 and weaker, and the respirations had slowed down to 36.

At 3 P.M. a sudden and considerable change occurred. The lips and finger-tips became dusky, the mottling, where previously of a bright red, turned purple and then dusky, resembling post-mortem staining; the respirations quick and shallow; the child became clammy and cold; stimulants were used without effect; consciousness was fully retained; and when the screen was drawn round the bed the child exclaimed with a fairly strong voice, in a tone of grief and surprise, "Am I dying?" and death followed in less than three minutes.

The urine throughout contained a trace of albumen, but it was the merest trace. No casts were detected. The specific gravity ranged between 1012 and 1020. The amount passed varied from a pint and a half to two pints in the twenty-four hours; excepting from June 10th to the 14th inclusive, when not more than fifteen ounces were passed in twenty-four hours; on the 15th and 16th it rose again to over a pint.

There was a tendency throughout to obstinate constipation.

A *post-mortem* examination was made on June 18th by Dr. Tooth, and to him I am indebted for the following notes.

The body was generally thin and wasted; there was œdema of the thighs and ankles; the arms were strongly flexed at the elbows. The mammary development was practically nil, the hair on the pubes thin.

The brain appeared perfectly natural. The cerebellum, pons, and medulla were reserved for further examination; so also was the spinal cord, which was in good preservation, and appeared quite natural. The following nerves were reserved:—R. brachial plexus, R. vagus, R. phrenic, R. anterior crural, L. sciatic, and L. popliteal.

The biceps, gastrocnemii, and glutei were very pale.

The axillary glands were large and pale.

The tonsils were much enlarged. The larynx and trachea showed nothing abnormal.

The lungs weighed 12 ounces apiece; the bases of both were cedematous, but otherwise natural.

The heart weighed $6\frac{1}{2}$ ounces, and contained post-mortem clot on both sides. The aorta and vessels were natural. There was no valvular disease.

The subcutaneous tissue of the back was very cedematous; the fluid which drained from the tissues into the wound made on removing the cord soon clotted lightly.

The abdomen was natural. Liver was a little pale, and weighed 48 ounces, the spleen 5 ounces, and looked quite natural. Dr. Kanthack made a bacterioscopic investigation of the liver and spleen, which yielded no results. The pancreas was natural.

Many of the abdominal lymphatic glands were caseous, and some calcareous. The suprarenals were natural.

The kidneys were rather hyperæmic; the capsules parted with a little difficulty; the two weighed 9 ounces. The ureters and bladder were natural. The organs of generation showed nothing abnormal.

The right elbow joint showed nothing abnormal.

The cause of death was in no way apparent from the post-mortem examination.

At the time of writing this paper the examination of the nervous system had not been completed.

The clinical course, the mode of termination, the dearth of pathological material on which to base a cause of death, together make the case that has been described one of unusual occurrence; I might almost have used the word unique, had not Dr. Church reminded me that some fatal cases of obscure cedema had been described by Dr. Hadden.¹

What the condition should be called is a difficult matter. In the light of insufficient knowledge I have headed it "Fugitive Œdema of Obscure Origin," merely using a prominent outward and visible sign—and perhaps not the most important one—of some ill-understood condition. Whether the disease is one *sui generis*, or whether it has some pathological kinship to a disease better known under different clinical circumstances, I am unable to say.

The diagnosis resolves itself into an explanation of the cedema and erythema, but any theory offered in explanation must also take account of the cause of death.

¹ *Lancet*, 1886, vol. i. p. 1212.

First of all, can nephritis be held responsible? It is true there was slight but constant albuminuria, and some renal changes were observed at the autopsy, but the distribution of the œdema, a normal secretion of urine concurrent with the œdema, and the absence of casts are all points against nephritis. Then, again, nephritis would not account for the mode of death.

No important blood change was made out, and even if there had been, although it might have accounted for death, it would hardly have explained an œdema so local and so irregular in its distribution.

Was the condition an initial stage of myxœdema? Dr. Hadden, in the paper quoted, alludes to the fact that a transitory œdema has been observed as an initial stage of myxœdema, affecting face or limbs or trunk, and supervening perhaps more than once before the classical features appear.

The ill-developed child, the atrophied mammæ, the condition of skin following on parts previously œdematous, and the rather peculiar demeanour may all be early factors of myxœdema.

A claim may be made for rheumatism, but there is no evidence of arthritis or cardiac lesion to support it. But however freely we open our minds to ideas of rheumatism, it is difficult to see how this case can be brought within the range of a series of manifestations of the rheumatic diathesis, unless there be at the basis of rheumatism a neurosis vague, ill-defined, and more profound than we can know of.

This brings into consideration the question whether the condition can be accounted for by a neurosis? Can it be regarded as a case of so-called "angio-neurotic œdema"? That is to say, a neurosis affecting the vaso-motor system, whereby the action of the vaso-motor centres is disturbed, the permeability of the vessels is locally increased, and œdema of the part supervenes. A nervous origin would perhaps explain the capriciousness of the œdema and its tendency to symmetry, and also afford a cause of death. The onset and recurrence of the attacks of œdema occurring in a girl during the transition of life, in whom development, instead of going forward, was being arrested, would strengthen a theory that sought to connect the appearance of such a neurosis with the age of development, and to place the recurrence of it under the influence of some periodic constitutional change such as menstruation.

Lastly, as to the part played by the absorbent system. The enlargement of some of the lymphatic glands corresponding to parts that were œdematous has been noted, and at the autopsy many caseous and some calcareous lymphatic glands were found in the abdomen. In one of the cases recorded by Dr. Hadden

many of the abdominal lymphatic glands were found caseous, but then there was also present tubercular disease of the intestine and of one lung. It seems reasonable to infer that the lymphatic system contributed some part, and not an unimportant part, to the caprices of the œdema I have described; but whether it was an accessory after the œdema had occurred—the blocking of the absorbent system intensifying the œdema—or whether it was a primary cause of the œdema, is difficult to say.

It was my original purpose to have recorded the facts without comment, and pending a microscopic examination of the nervous system this course would probably have been the more logical. In the event of an examination of the nervous system affording any material evidence, I hope it will be recorded; but in the absence of such, I fail to find an explanation of the cause of death apart from the theory of a functional neurosis. However, the comments are given apart from the facts, knowing well how temporary the worth of these comments must be.

THE TREATMENT OF NÆVUS BY ELECTROLYSIS.

BY
H. LEWIS JONES, M.D.

A very considerable number of nævi are sent to the Electrical Department for treatment, the number being, on the average, sixty or seventy yearly. Out of 173 consecutive cases entered in the case books of the department, 52 occurred in males and 121 in females, showing that they are most probably commoner in the latter sex. They occur more often upon the upper portion of the body than upon the lower, the head and face being the commonest situation of all in our cases. The figures are, in 247 nævi—157 of head and neck, 80 of trunk, 10 of extremities.

Once only have I seen a nævus of the ocular conjunctiva, and eight or ten times at the anterior fontanelle.

In the lower part of the body the genital organs are not infrequently affected. In many of the cases the question has been asked as to whether the nævus was present at birth or not, and several times the mother has declared that there was nothing to be seen until some days or weeks later. I am inclined to believe that sometimes a nævus may originate after the birth of the child, but the mother is not certain, because the nævus may have been overlooked at first, or the existence of it may have been purposely concealed from the mother.

It does not often happen that more than one child of a family has had a nævus. Twice in my experience that has been the case.

The experience collected from these patients has led me to adopt the following or "unipolar" method of treatment as the most useful. Needles of platinum connected to the negative pole are inserted into the nævus; the circuit is completed through the patient's body by means of a well-moistened pad attached to the positive pole and placed underneath the patient's back

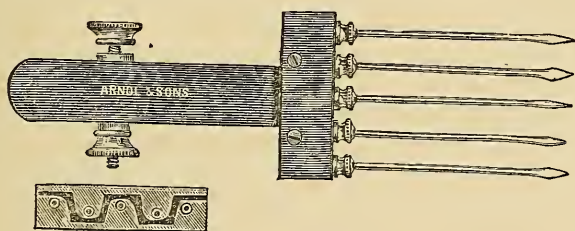
or hips. Small currents are employed, and the nævus is done gradually. The reason why this plan is preferred is because it gives the operator one set only of needles to manage; the density of current in the nævus is more evenly distributed; the changes produced at each of the needles are alike to one another, and there is little or no bleeding after withdrawal of the needles. Further, the systematic use of the same pole makes it easier to recognise the appearances which indicate that enough has been done, so as to stop the electrolytic action before the stage of complete destruction and sloughing. The objections to the unipolar arrangement of needles are that the current traverses the body of the child, who may therefore be affected by electric shocks, and the positive pad, if not carefully managed, may produce an undesired electrolysis in the wrong place. The first of these objections is not serious unless the nævus be situated on the head, and even then with proper care it becomes slight, if one remembers that the needles should be inserted and removed singly and gradually, and the full strength of the current turned on after the insertion of the needles, and turned off before they are all removed. If the needles are all pulled out while the full current is on, the patient is likely to show some sign of shock, such as an alteration in the rhythm of the breathing, or pallor and faintness. It must be remembered that the children are, as a rule, only a few weeks or months old, and are under the influence of an anæsthetic, and seem to be much more affected by shocks than if they were not anæsthetised.

It is not uncommon for small children to show signs of faintness under chloroform quite apart from electrical treatment; but if they be closely watched during the treatment of nævus by electrolysis, a certain amount of disturbance due to the current may often be detected at the moment of closing the circuit, when the nævus is situated upon the head; upon other parts of the body the effect is not perceived unless very large currents be used.

It is sufficient to be aware of this effect when dealing with nævi of the head, as it can easily be guarded against, and does not counterbalance the advantages of the unipolar method for head cases. The other danger, that of electrolysis at the seat of the positive pad, can be guarded against by strict attention to the pad and the conducting wire; both must be completely covered by moist material, as the smallest portion of uncovered metal will produce destructive effects at the place where it touches the skin. The sheaths of the pads are often made too small to cover the metal plate sufficiently, and on that account require very careful examination. If both poles are to be

inserted into the nævus, it is very convenient to have an arrangement of the needles in a handle like that shown in the figure, because it is then more easy to control the needles, and they are kept parallel to one another, and the action upon the tissues is evenly distributed. If the needles of the two poles converge towards the centre of the nævus, the electrolytic action will go on too rapidly where the points of the needles are close together, and too slowly at the margins where they are further apart. With loose needles, too, the points are apt to come into momentary contact inside the nævus, and so to produce unnecessary shock; and it is difficult to manage a number of separate needles, and to prevent them from falling out of the nævus, particularly if the child be at all restless under the anæsthetic. In the fork electrode the connections are so arranged that the needles are alternately positive and negative; and the number of needles used can be varied between two and five to suit the size of the nævus under treatment (see figure).

This fork or bipolar electrode is especially suited for sub-



cutaneous nævi. The use of iron or copper needles has been proposed for the electrolysis of nævi, on the ground that the metal of the positive pole is attacked during the passage of the current and passes into the tissues, where it may assist the destructive process. Iron or steel needles have long been in use, and the salts of iron set free by the electrolysis may no doubt be of service. Copper needles also act powerfully, oxychlorides of copper being formed. An objection to this "metallic electrolysis," as it is called, is that the positive pole must be used, and the needles adhere to the tissues, which are apt to bleed when the needles are pulled out. There is no doubt, however, that copper needles act very effectually. Experience is required to enable one to judge of the proper moment to arrest the electrolysis, as the appearances are rather different from those seen with platinum needles and the negative pole, so that one is apt to overdo the treatment.

The electrolysis of nævi has for its object the removal of the disease with the least amount of scarring, and it should be able to produce results which are better than those of other surgical modes of treating nævus, to compensate for the greater tediousness of the electrolytic method. Just as some nævi can best be dealt with by excision, by the ligature, or by the cautery, so certain types of nævus do best under electrolysis. Those upon exposed parts of the body, those which are chiefly or entirely subcutaneous, and those which occur on places such as the eyelids, the lips, the ear, and generally those which are difficult or awkward to reach by ordinary surgical methods, can often be very well done by electricity.

It may be taken as a principle of the electrolytic treatment of nævus that the current should not be pushed to such an extent as to cause the nævus to slough. If the nævus is to be got rid of by making it slough away, there are simpler methods of doing this than by electricity. It follows as a rider to this that electrolysis can very seldom be used so as to get rid of a nævus at one operation, unless it be quite a small one, for when this is attempted the result is almost certain to be a slough, and should be regarded as an unfavourable termination. By using weaker currents, and extending the treatment over two or three sittings (or more if the size of the nævus seems to require it), the nævoid tissue can be entirely got rid of without sloughing, and with much less scarring than is possible from any other mode of treatment. The object of the electrolytic method is to set up a certain degree of irritation in the nævus, just sufficient to cause its gradual consolidation, and no more. To get a good result with a nævus from electrolysis, one must be contented to deal with it in what may be called a "tinkering" sort of way, and it is best that this should be fully recognised.

If the nævus is very small, that is to say, under a fifth of an inch in diameter, it may be completely destroyed in one sitting, and the resulting scar will not be of any great moment; and here I would urge very seriously the importance of dealing with nævus at the first possible opportunity after birth. Nævi which are quite small at birth are often allowed to grow enormously before any interference is thought necessary, with the result of deplorable disfigurement, which might have been completely prevented by timely treatment. They should always be attacked at once.

It is true that nævi may spontaneously disappear, but this is a rare occurrence, and the usual tendency of a nævus in the young baby is to grow rapidly. I have only once, out of two

hundred and fifty nævi, seen a complete and satisfactory spontaneous disappearance of a nævus. More often a tendency to cicatrisation may be seen in the centre of a nævus which is still spreading at the edges. The active growth of nævi becomes less and less after a certain age, usually somewhere between the ages of twelve months and two years; they may then cease to show any growth, or may begin to diminish.

In adults one occasionally meets with nævi which are stationary, neither increasing nor diminishing in size during long periods of time.

It is not a very simple matter to specify the proper magnitude of current to use, as it depends upon the number of needles and the depth to which they are inserted, also upon the length of time they remain in one position. Currents up to sixty or even a hundred milliamperes have been recommended, but smaller currents than these probably give better results, and the action can be better controlled when the current is not so great. The best way of specifying the current is to take into consideration the number of needles used, and to say that for every inch of needle in the nævus twenty to thirty milliamperes is sufficient. Thus, if four negative needles are inserted to a depth of a quarter of an inch apiece, the total current may be twenty or thirty milliamperes. As the current is the same in all parts of a battery circuit, the needles at one of the poles only must be considered when estimating the proper current for the bi-polar method. Further, it follows from this that in the bi-polar method the number of positive and of negative needles should be approximately equal, for if there be four negative needles inserted to the depth of a quarter of an inch, and only one positive similarly inserted, the density of current at the positive needle will be four times as great as at the negative needles, and the destruction of tissue will go on too rapidly at the former. The progress of electrolysis is to be judged by the changes at the point of insertion of the needles. A greyish zone gradually shows itself round the negative needles, and indicates that it is time to withdraw the needle and insert it in a fresh place. If blackening shows itself over the line of the needle there will be sloughing of that part.

The most important part of the growing nævus is its edge. This must be chiefly attacked, as it is from the edge that growth takes place. Sometimes a nævus, which is apparently destroyed completely, will begin to grow again from some minute speck of nævoid tissue which has escaped notice from its extreme smallness.

Those nævi which are very turgid are most prone to slough after treatment.

The needles may be introduced either in a direction parallel to the surface or vertically; the former is the best when the nævus has any appreciable thickness. When it is a superficial cutaneous mark the latter is better; the treatment then becomes a sort of electrical tattooing, and answers very well. The best application after the operation is collodion containing iodoform in solution. This is especially convenient, as it sticks tightly upon the surface, and exercises a certain amount of pressure. It may be left for three or four days with safety, if the case is kept under close observation, and if there is no breaking down of the tissues; but after that length of time has elapsed, it is well to remove the collodion, and to treat the place with a little boracic ointment.

A CASE OF GENERAL TUBERCULOSIS,
WITH
CORTICAL TUBERCULAR MENINGITIS, PRODUCING
LOCALISING CEREBRAL SYMPTOMS.

BY
G. C. GARRATT, M.B.

The following case, recently under the care of Sir Dyce Duckworth, is published at his suggestion.

M. G., a girl aged 5, of healthy family, and previously in good health, complained on December 3 of aching in her forehead. During the day she became drowsy, and since then has not walked or uttered any sound. Since the 4th she has not even recognised her mother, but has slept almost constantly, and shown no sign of irritability. She has taken food when roused; has not vomited; the bowels have been confined. She has had no fits, no earache or otorrhœa; she has had no cough. Carried to the Surgery on December 7th in a drowsy state, she was given an enema with good result, but after became faint, and then convulsed. The face was drawn to the left, head and eyes turned to the left; arms were flexed and rigid, the left jerking spasmodically. This condition passed off in a few minutes, and she was sent up to the ward semi-conscious.

Note after admission to Elizabeth Ward. — The patient is a thin, delicate-looking girl, very drowsy, but when roused will sit up and feed herself with her left hand. She does not appear to suffer pain, does not squint or grind her teeth, lies on her back with legs extended. She never vomits; has no cough; never speaks, cries, or shows any sign of intelligence. The right side of the face looks blank, and the mouth is a little drawn to the left; irritation produces no movement in facial

muscles or occipito-frontalis on this side. She does not resist my opening the right eye, as she does the left; she can open it herself, but will not shut it as tight as the other. The right arm is never moved voluntarily, and but feebly on stimulation; the right leg moves better, but is weak. There is no paralysis on the left side. There is anæsthesia of the right side of the face, right cornea, and external auditory meatus; sensation seems dull in the right arm, and to less extent in the right leg; it seems good on the left side. The sole reflex is weak on the right, active on the left; knee-jerk is barely perceptible on the right, and weak even on the left; there is no clonus. Muscular nutrition does not differ on the two sides. There is rigidity in the muscles of the neck, and at times deviation of the head and eyes to the left; there is no retraction of the head or abdomen. The left arm when grasped becomes rigid and flexed; the wrist, fingers, and thumb are flexed too; if still held, it exhibits clonic movements, the rigidity extending to the right arm, but not becoming general, the legs remaining flaccid. The pupils are equal, moderately dilated, and react to light; there is no ocular paralysis, and no optic neuritis. The right tympanic membrane is normal, the left somewhat injected, but intact, and does not bulge; there is no sign of otorrhœa, nor of mastoid disease. The face is flushed symmetrically; tache cérébrale is readily obtained. Respirations are 36 to the minute, but regular; nothing abnormal is discovered in the lungs. Pulse is 108, regular, and of moderate volume and tension; heart sounds are loud, with a high-pitched systolic murmur at apex. There is nothing noteworthy about the digestive system, but the motions and urine are passed into the bed. Temperature is raised and irregular; maximum 101.4°.

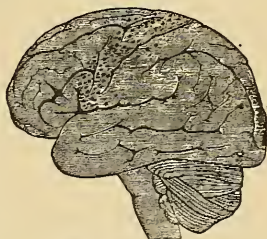
Subsequent Course of the Disease.—The child grew steadily worse and more drowsy; she never spoke, never knew her mother, never had any convulsion. On the 9th she could not be roused, and was fed by nasal tube; the face was more flushed, but still symmetrically; the pupils were widely dilated, but still equal. Conjugate deviation to left, and rigidity in neck and arms were permanent. She sweated much at night, but equally each side. Temperature, which reached 102.4° on the 8th, was coming down. On the 10th the child was comatose; there was Cheyne-Stokes breathing, and rapid, violent action of the heart; the murmur could still be heard. The rigidity had now spread to the legs, specially the left, but they remained extended. Temperature had fallen to 96.4°. She died early next morning, the temperature being then 100°.

Post-mortem Examination.

The description of the brain is taken from the Hospital record.

Brain.—Weight, 40 oz. ; ventricles not markedly distended.

There was a plentiful crop of yellowish tubercles, commencing in the left fissure of Sylvius, and spreading along the principal branch of the Sylvian artery, so as to be scattered thickly over the ascending frontal and hinder part of the three frontal convolutions in a broad strip, terminating at the longitudinal fissure above. There was adhesion of the contiguous surfaces of the Sylvian fissure on both sides. The basic arachnoid was thickened, and there was increase of fluid, but not much. No tubercles were visible to the naked eye at the base, or in the right hemisphere.



LATERAL SURFACE (LEFT.)

There was no otitis. The heart was normal.

There were grey tubercles in the lungs, the liver, and kidneys ; yellow tubercles in the spleen. There were caseous bronchial and abdominal lymph glands. No tubercle in the intestines or in the peritoneum.

Remarks.—The locality of the brain lesion was conjectured during life, but its nature remained uncertain. No cause was found for the very distinct systolic murmur ; on the other hand, the tubercle in the lungs gave no physical signs, though the breathing was somewhat hurried.

THREE CASES OF RIGHT ILIAC COLOTOMY FOR INTESTINAL OBSTRUCTION.

BY

D. H. GOODSALL.

CASE I.

T. N., aged 46, a labourer, was admitted into the Metropolitan Hospital under the care of Dr. Haig on August 4, 1890.

For the last eighteen months the patient has been losing flesh, and at times he has had pain across the lower part of the abdomen. Up to three weeks ago the bowels acted regularly every day, since then they have not done so; the last action was on the 30th ultimo. He took an aperient about three weeks ago; it acted, but not sufficiently. For three weeks he has had pain in the left iliac region. Sickness has been constant for the last nine days. The patient looks ill and wasted; he cannot pass any flatus.

The abdomen is resonant and somewhat distended, and there is some resistance and tenderness in the right iliac region.

August 6.—At 8 P.M., when first seen by me, there was dullness in the right iliac region, with occasional swelling of that part. This swelling was resonant, and could be easily got rid of by gentle pressure. On examination per rectum, no disease could be detected either inside or outside the bowel. Some fæces were removed from the rectum. Enemata had been used earlier in the day without bringing away any fæces. The patient said he felt relieved by the removal of the motion.

August 7.—The patient has slept fairly well. Abdomen somewhat distended and painful all over. The bowels acted again last night.

4 P.M.—The patient's condition not improving, the abdomen was opened in the right iliac region by an incision about three inches in length parallel to and $1\frac{1}{2}$ inches to the inner side of the anterior superior spine, the upper third of the incision being

about one inch above the level of the anterior superior spine. The cæcum was found distended and healthy in appearance. The parietal peritoneum having been sutured to the skin, the abdominal cavity was irrigated with warm boiled water. The front part of the cæcum was then drawn outside the opening into the abdomen, and was secured there by four sutures, passed through the substance of its front wall and through the skin about half an inch from the sides of the abdominal opening. Some of the water used in irrigating the abdomen drained away during the evening by the side of the dressings, and they had to be changed.

August 8.—The patient slept occasionally during the night; no regular sleep. He complains of pain from flatulence. The wound looks healthy; no firm adhesion between the bowel and the parietal peritoneum.

August 9, 10 A.M.—Patient steadily losing ground. There are still no firm adhesions between the cæcum and the parietal peritoneum. To relieve the distension the cæcum was opened by an incision about an inch in length. A large quantity of liquid fæces immediately escaped, with much relief to the patient.

4 P.M.—The patient died forty-eight hours after the operation. On admission the temperature was 98.2° , and it kept between 98.2° and 97° till his death. At the post-mortem a cancerous growth occupying about half the circumference of the inner surface of the ascending colon, and about $1\frac{1}{2}$ inch in length, situated about $1\frac{1}{2}$ to 2 inches above the commencement of the ascending colon, was found.

CASE II.

F. F., aged 34, a clerk, was seen by me in consultation with Dr. Dodsworth of Gunnersbury on October 31, 1890.

History.—His bowels acted for the last time nine days ago. Since then he has taken aperient pills, senna draughts, castor-oil, and croton-oil. Enemata of various kinds have also been used. Two days ago vomiting began, and the abdomen became greatly distended. He has never had a similar attack, and has always enjoyed excellent health.

Family history.—His father living, 63, healthy. His mother died, 55, of apoplexy. His grandmother and two uncles died of cancer.

The vomiting still continues. Temperature normal. Abdomen greatly distended, and resonant everywhere excepting in the right iliac region, where it is quite dull on percussion. He

cannot pass any flatus; says he has very little discomfort beyond the tight feeling of the abdomen. He attributes his illness to having eaten a pound of raw chestnuts.

November 1.—The abdominal distension being greater and the vomiting more severe, I decided to open the cæcum. Having made an incision about $2\frac{1}{2}$ inches in length, parallel to and about an inch to the inner side of the anterior superior spine of the right ilium, through the abdominal parietes, I found the cæcum greatly distended, adherent in places to the parietal peritoneum, and at one part, about the size of a shilling, almost gangrenous. The parietal peritoneum having been sutured to the skin, two sutures were passed for about $1\frac{1}{2}$ inch in the long axis of the cæcum, through the front wall of the bowel. The sutures were parallel to each other, and about an inch apart. These sutures were then fastened to the skin on each side of the wound, and about an inch from it. The cæcum was then opened by an incision about half an inch in length, parallel to and between the two sutures passed through the front wall of the cæcum. Within half an hour two gallons and half a pint of liquid fæces had escaped from the opening in the cæcum. The patient was not removed from the operation-table for forty-eight hours.

November 2.—Temperature 99.2° ; before the operation it was 98° . Some flatus passed per rectum.

November 5.—All the sutures were removed.

November 13.—The bowels acted per rectum.

From November 25 to December 22, 1890, there was diarrhœa from the cæcal opening, and on four days fæces were passed per rectum.

December 22.—A small, hard, freely movable tumour can be felt through the wall of the rectum on the right side of the pelvis; it is painless when touched.

From December 23 to February 17, 1891, when he returned to his office work, the bowels acted about four times a day through the cæcal opening, the first motion being relaxed and the others formed. The bowels also acted once a day per rectum. The motion was always formed.

February 17, 1891.—The bowels act once or twice by the cæcal opening and once per rectum every day. The growth in the right side of the pelvis is larger; in other respects it is unchanged.

June 25.—From this date till February 18, 1892, the bowels acted once or twice a day through the cæcal opening only.

April 1892.—The bowels now act from four to six times a day, but only through the cæcal opening.

July.—The bowels now act about four times during the day, and twice during the night, through the cæcal opening only.

September 29.—For the last three days he has passed some blood with the urine.

From September 29 to November 23 he took 3ii. of Chian turpentine mixture three times a day. There has been no recurrence of the hæmorrhage from the bladder.

From November 26 to January 19, 1893, when the patient died, the bowels acted several times a day, but only per rectum.

For the last fourteen months of his life some mucus, with more or less blood, was passed every day from the rectum. The quantity of mucus passed gradually increased. For nearly the last four months he was more or less jaundiced.

The patient was a well-known lawn-tennis player. His weight before the illness began was 8 st. 11 lbs.; his height 5 ft. 9½ in.

	St. lbs. oz.
On January 16, 1891 (eleven weeks after the operation), he weighed	10 2 8
March 26	11 1 14
July 2	10 3 13
November 3, 1892	8 6 12

CASE III.

R. B., aged 62, a cabman, was admitted into the Metropolitan Hospital on September 18, 1894, with intestinal obstruction, caused by cancer of the rectum.

History.—About eighteen months ago he began losing blood occasionally from the rectum. He had never had piles. Later on he had to take aperients about once a week, because the bowels were getting more and more constipated. About two months ago he took a senna draught; it did not make the bowels act, although it caused very severe griping. The draught was followed by a seidlitz powder, and then by castor-oil, which caused vomiting, and subsequently the bowels were freely relieved. Twenty-two days ago he took one ounce of castor-oil. For several hours it caused severe griping; fourteen hours after taking the oil the bowels were freely relieved. Since then the bowels have not been freely relieved.

For the last six months he has been losing flesh.

On examination per rectum, a malignant growth was found, commencing about 3 inches above the anus, involving the whole of the circumference of the bowel, and so tightly constricting

the passage that the finger could not be passed through the stricture.

September 19.—The abdomen was opened in the left iliac region, and the parietal peritoneum was sutured to the skin. The sigmoid flexure of the colon was then found so distended with firm fæces that it could not be brought outside the abdominal cavity. Two sutures, one at each angle of the wound, were passed under the longitudinal muscular band, and fastened

CASE III.



to the skin. The wound was then dressed with protective and salembroth gauze.

September 21.—On dressing the wound, it was found that several appendices had slipped out of the peritoneal cavity by the side of the colon. They had become much swollen, and were anchoring the bowel into the wound. Both sutures passed under the longitudinal muscular band had cut their way through it.

September 25.—The appendices in the wound were removed, and then it was found that both the position and the distension of the bowel were unchanged.

September 26.—The patient complains there is much tenderness about an inch above and to the outer side of the umbilicus, and says he feels too sick to take food. His breath has a strong faecal odour.

As the sigmoid flexure could not be brought out of the wound, it was decided to open the caecum. A vertical incision, 3 inches in length, was made in the right iliac region, about $1\frac{1}{2}$ inch to the inner side of the right anterior superior spine. The parietal peritoneum having been sutured to the skin, an attempt was made to bring the caecum outside the peritoneal cavity, but this part of the colon was found almost as much distended as the sigmoid flexure with firm faeces. By manipulation, about $1\frac{1}{2}$ inch of the front wall of the caecum was brought into the wound, the faeces having been pressed into the ascending colon. Two sutures were then passed through the front wall of the caecum and in its long axis, and about an inch apart. These sutures were then fastened, the one to the skin, an inch to the inner side of the wound, and the other an inch to the outer side of the wound. The caecum was then opened by an incision about an inch in length, parallel to and between the two sutures. Four Spencer Wells forceps were also fastened to the opening into the caecum, to assist in keeping it outside the peritoneal cavity. The bowel acted very slowly through the opening, because of the putty-like character of the faeces.

The patient was kept on a water-bed on the operation table for forty-eight hours after the operation, and was then removed to his bed.

September 30.—All sutures were removed.

December 8.—The patient was discharged.

January 2, 1895.—He has gained 17 lbs. since October 30, 1894.

REMARKS.

In the first case it appeared to me that the irrigation of the peritoneal cavity greatly assisted in preventing the adhesion of the caecum to the sides of the abdominal incision; further, that the delay in opening the bowel kept up peristaltic movement, and so assisted in preventing adhesion, and it also kept up the pains, sickness, and discomfort caused by the obstruction.

In the second case I decided to open the caecum immediately, and in order to prevent the escape of faeces into the peritoneal cavity, the patient was not removed from the operation table

until sufficient time had elapsed for firm adhesion to form between the cæcum and the sides of the wound. The patient was kept on the table for about forty-eight hours without a water-bed, and was then removed to his bed. In the course of a few days a very large bedsore formed.

In the third case the patient was placed on a water-bed before the completion of the operation, and he was kept on it for nearly a fortnight. No bedsore resulted in his case.

It is said that when the cæcum is opened the fæces are always liquid. In the first case, which lived forty-eight hours, they were liquid. In the second case, which lived two years and three months, they were at first liquid, and then they were for nearly eighteen months always more or less firm. In the third case, now twelve weeks old, the difficulty has been to keep the fæces sufficiently soft to allow of their passage through the opening in the cæcum.

There is a distinct advantage which an opening in the cæcum gives over an opening into the sigmoid flexure, and that is that in the cæcal opening there is no prolapse of the bowel.

In both the second and third cases the opening has shown a strong tendency to contract, much more so than many colotomy openings in the left iliac region do.

I think that in cases of obstruction confined to the colon it will be found that opening the cæcum is a better operation than opening the descending or ascending colon, when from any cause left iliac colotomy cannot be performed or will not relieve the obstruction.

The photograph of the third case shows the absence of any prolapse of the large intestine.

ACCOUNT OF A CASE
IN WHICH THE
SUPERFICIAL FEMORAL, THE DEEP FEMORAL,
AND THE PÓPLITEAL ARTERIES,
WITH THEIR CORRESPONDING VEINS, WERE TIED IN THE
COURSE OF AN OPERATION WITHOUT DAMAGE
TO THE VITALITY OF THE LIMB.

BY
THOMAS SMITH.

George G., æt. 37, a packer by occupation, was admitted into my wards October 12, 1894. He was a healthy man with a good family history. About ten months ago he noticed a small lump on the inner side of his thigh, which at first gave him no inconvenience, and grew very slowly; more recently it has increased rapidly, and has given him some pain, so that he has had to give up work.

On admission there was found to be a firm lobulated tumour about the middle of the thigh on the adductor aspect, the size of a large fist. It had the sartorius over it, and its deeper part seemed to be among the adductor muscles; it occupied about the middle third of the thigh, and obscured the femoral vessels. The skin was freely movable over the tumour, and the latter could be easily swayed about, and was not apparently attached to the bones. The patient complained of pain in the tumour and down the course of the internal saphena nerve; there was no glandular enlargement.

The tumour was considered to be a sarcoma, and it was thought possible to remove it. To this the patient consented, but he bargained that he was not to lose his leg. On October 17th the operation was performed, a long incision being

required and a pretty extensive dissection. It was found that the tumour was intimately connected with the vessels and deep muscles of the thigh, and that a considerable portion of it penetrated the adductor magnus. The femoral artery and vein were ligatured and divided. The profunda vessels were also tied, and the upper part of the popliteal artery and vein; indeed, about four inches of the femoral and profunda vessels were removed with the tumour: the wound was dressed antiseptically, and the limb was wrapped up in cotton-wool, and neither immediately after the operation nor at any subsequent period of his convalescence was there any sign of deficient circulation in the limb. The recovery was uninterrupted, and from the second day of the operation the general temperature was normal or subnormal. I saw the patient on December 21st walking with comfort, and only complaining of numbness on the inner side of his leg from the loss of his long saphena nerve, which had necessarily been removed with the tumour. On examination, the tumour proved to be a very firm spindle-celled sarcoma, having within it two or more small cysts. With the tumour four inches of the femoral and profunda arteries had been removed with their corresponding veins. The growth apparently originated in the connective tissue about Hunter's canal; the femoral vein was completely blocked with new growth which filled its canal. The artery was surrounded entirely and compressed by the growth, which was adherent to its walls, but had not penetrated it at any part; the calibre of the vessel was much diminished, so that but a small stream of blood could have passed through it.

I have thought this case worthy of being put on record, as the issue of the operation, in conjunction with the circumstances of the case, was contrary to the results of general surgical experience.

That the lower limb could be deprived of its chief sources of blood supply, in the manner detailed, without any serious impairment of nutrition, was to me as a most agreeable surprise. The local removal of the tumour before the operation seemed quite feasible, and there was no suspicion that its substance was traversed by the main vessels of the limb; the tumour was growing rapidly, and a fatal result seemed inevitable unless the disease could be removed. The patient was quite willing to have the tumour removed, but quite determined not to submit to amputation under any circumstances, and thus it was that the hazardous course came to be adopted.

The condition of the main vessels before the operation no doubt contributed to the successful issue of the case; they

must for some time have been compressed by the tumour, and the obstruction must have been progressive in degree, so that circumstances were favourable for the establishment of a collateral circulation; still this of itself would scarcely explain the absence of any sign of defective nutrition in the limb after the operation, and I would suggest that the antiseptic method of wound treatment and the aseptic course of the convalescence may have greatly favoured the progress of events. It is more than probable that aseptic wound-healing taxes the reparative powers very little, and that, as a consequence, there is but small, if any, demand for an increased blood supply to the wounded part.

A SECOND YEAR'S SURGERY

AT

ST. BARTHOLOMEW'S HOSPITAL.

BY
HENRY T. BUTLIN.

In the last volume of our Reports (page 89) I gave an account of a year's surgery, during which I had made the attempt to dispense with some of the rigid details of the antiseptic method, and showed how suppuration had followed operations, particularly those of certain kinds, much too frequently. It is only just that in this volume I should compare the results of a second year's surgery under similar conditions, but with the difference that strict antiseptic methods were carried out throughout the year.

As there are many antiseptic methods at the present time, and the mere statement that antiseptic precautions have been employed does not offer any clear idea to the reader of what was actually done, I will shortly describe the method, which was maintained, with trivial exceptions, during the year.

Preparation of the Skin.—The patient had, if possible, a bath on the night before the operation. Then the dresser of the case, after thoroughly preparing his own hands, shaved off hair, when this was necessary, and scrubbed the whole field of the operation with warm soft soap and water. After the soap had been cleaned off with absorbent wool, dipped in 1 in 2000 biniodide of mercury lotion, the skin was rubbed over with blue (alembroth) wool dipped in ether. It was then washed with 1 in 500 biniodide of mercury solution, and finally covered with carbolic gauze which had been thoroughly soaked in a solution of 1 in 4000 biniodide of mercury, in glycerine, and water. This dressing was covered with gutta-percha tissue, and kept on until the operation.

The *instruments* were boiled for half an hour, then transferred to a dish containing 1 in 40 carbolic lotion.

Blue wool was often used for *sponges*, but if natural sponges were used, they were washed after use with soap and water, rinsed, and placed in a strong solution of washing-soda for twelve hours, transferred to a solution of sulphurous acid for twelve hours, rinsed in sterilised water, and finally put into jars containing 1 in 20 carbolic solution.

Silk and catgut were generally used for *sutures* and *ligatures*. The former was boiled for an hour, then placed in vessels containing 1 in 500 biniodide of mercury solution. The catgut was wound on to flat pieces of board, which had been first thoroughly boiled. It was rubbed with ether to remove the grease, scrubbed with a nail-brush kept in 1 in 500 biniodide of mercury solution. The soap with which it was scrubbed was washed away with biniodide solution, and the catgut was placed in this solution (1 in 500) for forty-eight hours, and finally kept in a fresh quantity of the same solution.

The *hands* of those taking part in the operation were cleansed by first cutting the nails and scrubbing them with brushes which were always kept in 1 in 20 carbolic solution (the brushes were boiled before putting them into their jars). The hands were finally rinsed and rubbed with a solution of biniodide of mercury (1 in 500).

For *dressings*, blue (alembroth) gauze was generally employed. To prevent irritation of the skin, iodoform was powdered over it, and the gauze was applied wet with 1 in 40 carbolic lotion. Dry gauze was applied over the wet, then boracic wool, and finally waterproof sheeting.

Let me say that the active preparation of the skin which has been described is only suitable for the skins of hospital patients. It is not only too vigorous, but wholly unnecessary for patients outside the hospital. Indeed, in some of the hospital patients a smart eruption was not infrequently produced, which was sometimes pustular. To say nothing of the discomfort which is produced by such a condition of the skin, I am not at all sure that it is more desirable to operate through skin which is the seat of a pustular eruption than it is to operate through skin which has been theoretically imperfectly prepared.

The printed paper which was given to each dresser was modified slightly to meet the new requirements, particularly in the paragraphs referring to the cleansing of the hands; and a short paragraph was introduced desiring that dressings should be removed from wounds, whether suppurating or not, with forceps, not with the fingers, on the ground that forceps can be easily cleansed by boiling, while it is difficult to cleanse the fingers after they have been bathed in pus or other discharges.

It required two or three months before my whole staff was drilled to perfection in the details which were employed. Consequently, there were some suppurating wounds during the first six weeks or two months. But, owing to the unremitting attention of my House-Surgeons, Mr. W. B. Jones and Mr. Furnivall, defects were gradually removed, and the details of the method were smoothly carried out.

I shall adopt the same order in the consideration of the results as I did in my paper last year. The charts of operation were drawn up by my House-Surgeons, Mr. Armstead, Mr. Jones, and Mr. Furnivall, to whom I left the duty of filling in the result; and I am very much indebted to all these gentlemen for the care each of them has taken, not only in keeping the charts, but in securing the proper observance of all the details of the methods which were adopted.

For the better comparison of the results of the two years, I shall deal with precisely similar groups of operations. And I shall use the same terms as in last year's paper, "Perfect," "Suppurated," and "Fatal."

Amputations.—Five cases (thigh 3; leg 1; Syme 1):—

Perfect	.	.	.	.	.	.	2
Suppurated	.	.	.	.	.	.	3
							<hr/>
Total	.	.	.	.	.	.	5

The amputations of the thigh were performed for traumatic gangrene following ligature of the common femoral artery and vein, which had been wounded; for acute traumatic suppuration of the knee-joint; and for tuberculous disease of the knee-joint. In the third case there was no suppuration after the operation; but in the first and second cases there was suppuration, which is scarcely to be wondered at when it is taken into account that the operation was in each case performed under very disadvantageous circumstances. In both cases there was decomposing pus, and it was impossible to disinfect the parts thoroughly for the amputation, although great pains were taken to do so.

The leg was amputated for a recurring sarcoma, and the wound healed at once; and the Syme's amputation was performed for extensive suppurating tuberculous disease of the tarsus. The wound healed almost entirely by the first intention, but there was here and there slight superficial ulceration and suppuration.

Opening of Healthy Joints.—One case:—

Perfect	1
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The joint was freely opened in a young man for the treatment of a re-fracture of the patella. Although the fragments were widely separated, it was not difficult to bring them together. They were fixed with stout silver wire. The wound healed at once, but an unfortunate accident when the operation was finished did much to spoil the success. The patient, who was a very muscular and vigorous man, recovered from the effects of the anæsthetic before the apparatus had been firmly applied, and gave a violent kick with the bad leg. As a consequence, one of the wires seemed to have torn through the rather soft bone, and instead of firm union all along the line, there was a wedge-shaped slit, and it is doubtful whether even at the narrow end of the wedge there was bony union.

Removal of Tumours.—Fourteen cases (these include only cases in which the disease was so situated that an attempt could be made to obtain primary union; epitheliomas of the lip, &c., are not included):—

Perfect	.	.	.	.	.	.	.	12
Died .	.	.	.	.	.	.	.	2
<hr/>								
Total	.	.	.	.	.	.	.	14

Four of the tumours were cystic of the thyroid; two were dermoid of the neck (one in a man 62 years old); one was a cyst in the canal of Nuck; one a large mass of fat and fibrous tissue in the omentum protruding through a narrow femoral canal; two were tumours of the breast; one a lipoma of the arm; and there were two sarcomatous tumours, one of the parotid gland, the other of the leg. The sarcoma of the leg was apparently periosteal, and grew from the periosteum covering the lower part of the back of the tibia. It was very soft and adherent to the surrounding structures, from which it could only be separated with difficulty. I should have amputated the leg as soon as the nature and attachments of the growth were discovered, but the consent of the boy's parents could not be obtained. The wound healed by the first intention, but the tumour instantly began to grow again. Within five weeks of the operation the leg was amputated, and again the wound healed immediately. The fatalities followed the removal of a very large cyst of the thyroid and a sarcoma of the parotid. The cyst was the largest I have ever seen in the thyroid. It occupied the left lobe in a man 66 years old, and pushed the larynx and trachea over to the right side, causing so much dyspnoea from time to time that the patient was forced to seek relief. The operation passed off

without difficulty, save that there was bleeding deep down in the bottom of the wound, which could only be arrested by pressure. Within a short time of the operation the patient showed signs of serious danger and the breathing was of the Cheyne-Stokes type. The same afternoon he died. I cannot but believe that death was due to the sudden removal of pressure on the great vessels and nerves of the neck. After the wall of the cyst had been exposed, it was shelled out with the finger, which was so easily done that there was no possibility of actual injury to the structures beneath it. Nothing was discovered after death to account for it. The woman from whom a sarcoma of the parotid had been dissected out, with some difficulty, on account of its size and deep attachments, died almost suddenly on the day following the operation. Some hæmorrhage had taken place on the evening of the operation, and my House-Surgeon had removed the dressings and plugged the wound, for no bleeding vessel was observed. While I was in the ward on the following day, I was suddenly called to the patient, whom I found bathed in blood and almost pulseless. The dressings were at once removed, the blood-clot cleared out, and gauze firmly inserted to the bottom of the cavity. The hæmorrhage was at once arrested, but the woman died the same afternoon from exhaustion, consequent on the loss of so large a quantity of blood. She was forty-eight years of age, and the sarcoma was of the round-celled variety. There was no affection of the glands.

As will presently be seen, these were the only deaths during the year which were directly due to operation.

Removal of Glands, either strumous (but not suppurating) or malignant, four cases:—

Perfect	4
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In every instance the glands were cervical. In two cases they were removed for malignant disease; in two cases for tubercle.

Varicocele, six cases:—

Perfect	.	.	.	.	.	.	.	5
Suppurated	.	.	.	.	.	.	.	1
								<hr/>
Total	.	.	.	.	.	.	.	6

Suppuration occurred in a case in which oozing of blood necessitated the opening up of the wound, which was plugged with gauze and afterwards healed by granulations. In order to diminish this oozing, which not infrequently follows operation for the treatment of varicocele by the open method, and which

takes place generally from the vessels in the coverings of the cord, and not from the veins which have been tied and cut, I have for many months past been in the habit of winding long narrow strips of iodoform gauze around the scrotum, in such a manner as to maintain fairly equal pressure upon it. When this has been done, it is easy to keep the scrotum up against the abdomen, or nearly in that position. Since this has been done, there has not been a case of hæmorrhage after operation for varicocele, and the collection of blood which almost invariably forms in the space between the cut ends of the veins and clots there, is reduced to the smallest size. Iodoform gauze has been used in preference to other gauze on account of its softness and the greater adaptability to the surface of the scrotum.

Varicose Veins, five cases:—

Perfect	.	.	.	.	.	4
Suppurated	.	.	.	.	.	1
						—
Total	.	.	.	.	.	5

Slight suppuration took place in two of five wounds which were made in one case. In all five cases the veins were exposed, tied with catgut, and portions of them were cut away.

Radical Cure of Hernia, twenty-seven cases:—

Perfect	.	.	.	.	.	18
Suppurated	.	.	.	.	.	9
						—
Total	.	.	.	.	.	27

In twenty-four cases the operation was performed for the cure of inguinal hernia, and in ten of the twenty-four Bassini's operation was performed. In a number of our Hospital Journal for this year a clinical lecture on the radical cure (which I delivered in the summer) is printed, and the operations practised and the methods adopted are discussed at length. Two were for femoral hernia, and in both cases slight skin suppuration took place; and one operation was for a very large umbilical hernia.

The number of cases in which suppuration occurred was still large, although the difference between the results of last year and of this year in relation to these operations for the radical cure of hernia is extraordinarily in favour of this year. The suppuration was in most of the cases very slight and superficial; and it occurred chiefly in the cases which were operated on during the early period of the year, before my staff had been thoroughly drilled in the details of the antiseptic treatment which was carried out during the year. I shall speak of this later.

Amputation of the Breast, 15 cases :—

Perfect	.	.	.	.	.	.	13
Suppurated	.	.	.	.	.	.	2
							<hr/>
Total	.	.	.	.	.	.	15

In all these cases, with one exception, the contents of the axilla were removed. They were almost all large operations, some of them very extensive, involving the removal of large areas of the integument, and the turning round of large skin flaps to fill in the gaps. Profuse suppuration occurred in two of the cases, and in both the cancer was ulcerated before the operation. There was a vast difference in the character of the ulceration in the two cases. In the one case it was of the dry, indolent type; in the other, horribly foul and fungating, with profuse discharge from a deep cavity. In this case it was impossible to thoroughly cleanse the sore, and pus ran down from it over the skin even during the operation. But in the first case, very careful attempts were made to render the ulcer aseptic, and it was hoped that the attempts had been attended with success. Both wounds suppurated terribly, and apparently in a precisely similar manner, and the older of the two patients was so ill that it was for a long time feared that she would die. I have been so much impressed with the difficulty of cleansing these cancerous ulcers, and of the danger to which they give rise if an operation is performed, that we are now giving attention to the question of rendering them aseptic.

Reviewing the total results of the year, I have performed about 170 operations, and there have been eleven deaths after operation. But only two of the deaths are attributable to causes directly connected with the operation, and in neither case was death due to sepsis or to the wrongdoing of a wound. Both cases are described under the heading of Removal of Tumours. Four of the deaths followed laparotomy for acute intestinal obstruction, and one death followed laparotomy for intestinal obstruction in a patient with malignant disease of the transverse colon, in whom a leakage had recently taken place. The acute obstructions were of the worst form, the intestines ulcerated or gangrenous, and the patients, three of whom were young children, in a desperate condition. Operation was performed in the hope that the mischief might be of limited extent and still remediable.

Two patients died of intra-cranial mischief dependent on old suppuration in the ears. The cases deserve more than a passing notice. The first was that of a boy 16 years of age, who was

admitted very ill, with a high but variable temperature, and a history of rigors. There was suppuration in the right ear, tenderness at the back of the ear, and some tenderness and stiffness of the right side of the neck. I opened the mastoid antrum and the lateral sinus, tied the jugular vein, and cleared out decomposing clot from the sinus and vein. During the next two or three days the boy was much better, and it appeared as if he might make an excellent and uninterrupted recovery. Then his symptoms slowly recurred. I once more opened up the wound, and washed out the cavity and lateral sinus with strong antiseptic solution. But the course of the disease was not materially improved, and the boy eventually died. An autopsy discovered decomposing clot in the right cavernous sinus, whence it had spread to the left cavernous sinus. There was meningitis, and an abscess in the LEFT temporo-sphenoidal lobe, which had probably formed during the last week of his life, after the disease had spread to the left side.

The other case was one of peculiar difficulty. The patient, a man thirty-nine years old, had had suppuration in both ears for many years, and was admitted to the Hospital very ill and stone deaf on both sides, so that it was extremely difficult to obtain any reliable history of his previous condition. I opened the mastoid antrum on both sides, and found a little pus on the left side, but none on the right side. He was really scarcely at all relieved by the operation. A consultation was held with several of my surgical colleagues as to the propriety of further surgical interference; and fortunately my colleague, Mr. Cumberbatch, who presides over the aural department, was able to be present. He agreed with me that the symptoms pointed rather to meningitis than to any other form of intracranial mischief. No operation was performed, and in the course of a few days the patient died. The autopsy proved the correctness of the diagnosis, and that the case was not one in which an operation was indicated.

I opened the bladder above the pubes in a man who was suffering from severe and repeated hæmorrhages, such as to bring him to death's door. No actual tumour was discovered, but infiltration of the wall of the bladder with some soft vascular substance, which here and there projected in the form of a tiny button, which bled profusely when it was touched. There was obviously nothing to be done for the patient, and a few days later he died of exhaustion due to repeated hæmorrhage. The wall of the bladder was examined microscopically, and found to be carcinomatous, but without any actual tumour formation. The Museum of the Royal

College of Surgeons contains an excellent specimen of this form of infiltrating cancer, but of the stomach. In the Transactions of the Pathological Society, xxviii. 165, I have described a case of infiltrating carcinoma of the wall of the bladder, but it was extremely hard, and in its hardness differed from the disease in the present case. In that case death occurred chiefly from hæmorrhage.

The last fatal case was also one of interest. Its exact pathology is not even now apparent. A girl, æt. 13, was admitted into the Hospital, suffering from hæmaturia, which was of such a character, and associated with such symptoms, as led to the belief that it depended on some affection of the bladder. But examination with a sound and with the finger, after incision of the upper wall of the urethra, did not discover any disease there. The girl became very ill, with a high temperature, and complained of pain in the left loin. But it was not until many days had passed that a tumour was discovered in the situation of the left kidney. This was cut down on from behind, and proved to be a very large kidney, containing pus in its dilated pelvis. No stone or tumour was found, and the pelvis of the kidney was drained, but no improvement followed the operation. In the course of two or three days there was gradual suppression of urine, and the patient died. No autopsy was permitted. Whether there was a calculus in the kidney, or whether there was tuberculous disease of the urinary mucous membrane I do not know.

The account of the fatal cases shows that only two of them can be attributed to operation. Nine patients died in spite of operation.

Comparing the results of all operations with those of last year, there can be no question that they are decidedly better, not in lowering the rate of mortality, but in the far less frequency and less gravity of suppuration. This was particularly shown in two classes of operations, those for the radical cure of hernia and those for amputation of the breast; and more particularly after the details of the antiseptic method had been perfected and drilled into all those who had to take part in the making or dressing of wounds. During a period of about eight months not one freshly made wound suppurated, unless there had been ulceration or suppuration of the part operated on at the time of the operation. But in such a Hospital as ours, where the students take an active part in the surgical work of the wards, such a result requires unceasing care and watchfulness on the part of the Surgeon, and still more on the part of the House-Surgeons. The best system in

the world is not proof against ignorance and carelessness. As an example of the former, I may adduce a curious little practice which I have seen repeated again and again. The Surgeon going round his wards asks for a probe. A probe is taken out of a pocket-case, dipped into a solution of carbolic acid (1 in 40 of course), and handed to the Surgeon with an air which proves that the lender considers that he has done everything which could be expected of him as a true believer in the antiseptic method. I am glad to be able to state that this sight is rarely seen in my wards now. Careful instruction has taught the dressers and nurses that if a probe is sterilised before it is used, there is no need to dip it in carbolic solution; and if it is dirty, it might as well be dipped in the Thames as passed through a solution of carbolic acid. Carelessness and indolence cannot be combated on general principles; they can only be met by incessant watchfulness on the part of the Surgeon and House-Surgeon.

Of all the operations which I am frequently in the habit of performing in the Hospital, I believe that none tests the perfection of a method better than that for the radical cure of hernia. During the year in which I attempted to do without rigid antiseptic methods, suppuration was the rule, primary union the exception. And not only suppuration, but in many cases deep and profuse suppuration. Also, there were many little troubles which are now rarely observed, such as orchitis and collections of fluid in the tunica vaginalis. During the second year of rigid antiseptic methods, suppuration has become the exception in these cases, and when it has occurred, has been usually slight and superficial; while the accidents of which I speak have almost wholly disappeared. Yet, even now, the least want of care in detail in an operation for the radical cure of inguinal hernia is sure to be repaid by the appearance of pus, though it be but a little.

ON CHRONIC PURULENT CATARRH OF THE ACCESSORY NASAL SINUSES.

BY

W. J. WALSHAM.

I have selected this subject for an article in our Reports because it is one in which I have been much interested for the last few years, and because it is one, moreover, which has not yet found its way into the text-books on surgery. The condition under consideration must be distinguished, on the one hand, from acute purulent catarrh or suppuration, with which all are familiar, especially when it occurs in the antrum or frontal sinuses; and on the other hand from the chronic serous collection known as dropsy of the antrum when affecting that cavity. In the former condition, the swelling of the face, œdema of the eyelid, acute pain, tenderness on pressure, swelling of the cheek or of the forehead over the frontal sinuses, and sharp constitutional disturbance, followed often by escape of pus through the nose or the canine fossa into the mouth, are characteristic of suppuration in these situations; whilst the bulging of the walls of the antrum, the prominence of the cheek, perhaps protrusion of the eyeball, obstruction in the nose, or the yielding of the anterior wall on making pressure from within the cheek over the canine fossa, are equally well-known symptoms of dropsy of the antrum. In the condition under consideration, however, there is no acute disturbance; no bulging of the cheek or in the frontal region; in short, little beyond the nasal discharge or discomfort to attract the attention either of patient or surgeon to the source of the disease. The signs common to whichever of the accessory sinuses may be affected with the chronic purulent catarrh are: (1) a unilateral discharge of canary-coloured pus; (2) fœtor, which may or may not be intermittent; and (3) absence on inspecting the nose of a foreign body or rhinolith, syphilitic ulceration, necrosis or caries, or new growth, excepting polypi. A polypus attended

with a purulent discharge is in itself almost symptomatic of purulent catarrh of one or other of the accessory sinuses. Given, then, a unilateral discharge of pus with constant or intermittent fœtor, and the absence of the other conditions above mentioned, it becomes a question whence the pus is derived, in other words, which of the accessory sinuses is the one affected. To determine this point the nasal cavities should be inspected both anteriorly and posteriorly, the mucous membrane having been previously rendered insensitive by a 10 to 20 per cent. solution of cocaine, and sponged free of the discharge by small pellets of cotton-wool. The cocaine will also reduce any turgescence of the turbinal bodies that might otherwise obstruct the view.

If on anterior rhinoscopy the pus is seen trickling from below the middle spongy bone, *i.e.*, over its outer surface; if on pressing with a curved cannula on the outer wall of the nose in the region of the ostium of the antrum, the flow is promoted; and if, on the patient depressing his head, or on reclining it to the opposite side, the flow is increased, the presumptive evidence is in favour of antral trouble. If the fœtor is intermittent, the evidence is still stronger.

The pus, however, may come from the anterior ethmoidal cells or frontal sinuses, which also open through the infundibulum into the middle meatus; but when it comes from these cavities, it will usually flow over the anterior part of the outer surface of the middle turbinal, since the opening of the infundibulum is more anterior than the normal ostium of the antrum. These openings, however, vary in their situation and relation to each other, and too much stress must not be laid on the direction from which the pus apparently comes. The erect posture is said to favour the flow when the pus is derived from the frontal or ethmoidal cells.

Again, if the pus is seen trickling over the inner surface of the middle turbinal body, *i.e.*, between the middle turbinal and the septum, or if no pus is seen on anterior inspection, but on posterior rhinoscopy it is detected escaping from the region of the superior meatus, the trouble will probably be in the posterior ethmoidal or sphenoidal cells.

In all the cases I have seen in which the flow was from beneath the middle turbinal, antral disease, as subsequently proved by opening the sinus, was present. On the other hand, however, I have met with several cases of antral disease in which there was not the characteristic flow from beneath the middle turbinal. In one case no pus was seen whatever, although the patient complained of a discharge trickling down his throat,

especially in the morning. In another the escape of pus only occurred posteriorly; depression of the head and its lateral inclination, although persevered in, entirely failed to promote an anterior flow. When we consider the variable position that the opening of the antrum has in the middle meatus, and the many forms and conditions of the middle turbinal body, it is not surprising that the pus may take at times a backward instead of a forward direction. A deflection of the septum or erection or hypertrophy of the middle turbinal, by narrowing the passage anteriorly, may readily obstruct the usual channel.

Fœtor is an important sign. In one or two cases that have been under my care it was indeed the only sign calling attention to the condition. In antral catarrh, fœtor is commonly intermittent; in catarrh of the other sinuses, generally persistent. The fœtor in antral trouble may be perceptible both to the patient and the surgeon, or to the patient only. Several cases have come under my notice where I could detect absolutely nothing offensive either in the exhaled air or in the discharge, although the patients complained chiefly of the intermittent attacks of sickening odour. That this was not due to central or peripheral nervous trouble, as is well known it is sometimes, was proved by subsequent evacuation of offensive pus from the antrum and cessation of the unpleasant symptom. In other cases I have found the pus at times offensive, at other times quite sweet. The explanation of the intermittent fœtor is probably that the pus collects in the antrum, and there undergoes decomposition, and does not overflow till sufficient is collected to reach the ostium. But why the pus itself should be sometimes sweet, whilst that in the antrum is foul, is not easy of explanation. The odour is peculiar, quite different from that present in necrosis or caries of the bones, or in atrophic rhinitis.

The condition of the mucous membrane in the simple purulent catarrh would appear to be one similar to that of the bronchial mucous membrane in bronchiectasis; but there are other conditions that may give rise to the escape of pus in these cavities which I will not discuss, since I wish to confine myself in this communication to the symptoms, diagnosis, and treatment, rather than to the pathology and etiology of the affection. These may next be considered in detail according as the catarrh occurs in the different sinuses.

1. *Purulent Catarrh of the Antrum.*

In addition to what has already been said as regards the direction in which the pus flows through the nose and the fœtor, the following signs may be considered:—

(a.) *Dulness to percussion.*—In one or two cases that have come under my notice increased dulness on the affected side on percussing the cheek has been most marked. Although it is not a sign on which much reliance should be placed, yet in conjunction with other symptoms it is of some value.

(b.) *Tenderness on pressure* over the canine fossa is occasionally present. In the majority of the cases I have seen it was absent, or was not complained of till the patient's attention had been called to it by one or two examinations.

(c.) *Tenderness on tapping the teeth* has also not been a marked sign in my experience, although it has occurred in some reported cases.

(d.) *A carious tooth or fang*, or the history of past trouble in a tooth or fang, has so often been present, that I regard the irritation of a tooth-fang as the most common cause of the catarrh.

(e.) *Less brilliant lighting up of the face on the affected side on transillumination* is a sign of considerable value, and is a test which ought always to be applied. During the examination the room should be made dark by closing the shutters, and the electric light, if a transformer is used, obscured by a dark cap. I have never found the affected side quite dark; it has merely been less bright than the opposite side, and, contrary to what one might have expected, the brightness has been less under the eye of the affected side than over the lower part of the antrum, in which situation the pus is, of course, situated. In some instances, on transillumination, immediately below the margin of the orbit a distinct ring, the shadow of the pupil, appeared on the healthy side, but was absent on the affected side. In other instances, radiating outwards and upwards from the side of the nose there has been a cone-like brightness. This also was absent on the affected side. So far in my experience, whenever there has been defective transillumination of one side, there has nearly always been pus. In only one case did I fail to find it. Such, however, has not been the invariable experience of others. Defective transillumination, therefore, cannot be looked upon as pathognomonic of pus in the cavity. With me, however, it has been so constant, that when present in conjunction with other symptoms—a solid growth, of course, being absent—I do not hesitate to explore. In the case of solid growths, the opacity is usually greater.

(f.) *Injection of peroxide of hydrogen*.—When peroxide of hydrogen is injected through a small cannula into or in the neighbourhood of the ostium, the whole nose is said to become filled with froth from the action of the pus on the re-agent. I have not applied this test. All it would show, unless the cannula is passed into the antrum, a very difficult and often impossible procedure, is the presence of pus in the middle meatus, and this requires no demonstration, since it can be seen.

(g.) *Succussion*.—A splashing sound has occasionally been detected with the stethoscope on shaking the head. I have not heard it myself, and seeing how small is the cavity of the antrum, and how little fluid it can at the most contain, it can hardly be expected to be of constant occurrence.

(h.) *Exploration and the actual detection of pus* is practically, as in other situations, the only absolute way of making sure of its presence. The operation may be done through the nose, through the socket of a tooth, and through the canine fossa in the front wall of the antrum. I have practised all these methods. There is something to be said for and against each.

1. *Puncture through the nose*.—The puncture can be made here by a long fine trocar and cannula, either through the inferior or middle meatus. I have always chosen the former myself, as the instrument thus enters at a more dependent spot. With the mucous membrane rendered insensitive with cocaine, the exploration should be unattended with pain. The trocar and cannula, which should be made of steel, must be held very obliquely, and the nose drawn well over to the opposite side, so that the trocar may strike the bone as near a right angle as may be. The point of the trocar having been carried into the inferior meatus, its point should be pressed against the outer wall of the nose a little nearer the turbinal body than the floor of the meatus, as here the bone is thinner. A firm push will then cause it to enter the antrum. The trocar should now be withdrawn, and the nozzle of an antrum-syringe inserted into the end of the cannula. Boracic fluid is next syringed into the antrum, and if it contains pus, pus and fluid will flow out of the patient's nose, the head being slightly depressed and held over a basin. The disadvantages of the method are that if pus is discovered it is difficult to fix a tube and thus establish a drain through the nose, or to explore the cavity of the antrum with the finger if it is subsequently found necessary to do so. The opening, moreover, in this situation is not at the most dependent spot, and the patient cannot well attend to the after-irrigation himself.

2. *Puncture through the socket of a tooth*.—If a bicuspid or a

first or second molar has been lost, then probably the best method of exploring is through the empty socket. Some surgeons, even if the teeth are sound, recommend the removal of the first or second molar for the purpose of entering the antrum in this way. I would myself on no account remove a sound tooth; but if the bicuspid or first or second molar is carious, it may advantageously be extracted, since the fang may be at the bottom of the mischief, and the extraction and perforation of the antrum can be done at the same time. When an empty tooth-socket is chosen, a triangular perforator should be thrust up the socket in a slightly forward and inward direction, gas being sufficient for the operation. A fountain-tube is then introduced and boracic fluid pumped into the cavity with a hand-ball or Higginson's syringe as soon as the influence of the gas has passed off. If pus escapes, the opening made will be large enough, as a rule, for subsequent drainage. The objection to the method is that sufficient room cannot well be obtained through the socket should exploration with the finger be required, or curetting of the mucous membrane become necessary.

3. *Puncture through the canine fossa.*—An opening into the antrum in this situation from within the cheek is readily made with the triangular perforator, and can be easily enlarged if required. In some cases, however, I have found that the aperture would not readily heal when the mucous membrane of the antrum had been restored to its normal state, and one case remained, to my knowledge, as a permanent fistula. It is perhaps the best situation for exploration when the teeth are sound.

Treatment.—Having discovered pus in one or other of the ways above mentioned, irrigation and drainage for a longer or shorter period will be necessary. At first the antrum may be washed out twice a day with boracic fluid, later once a day, and then, as soon as the catarrh has ceased, the aperture may be allowed to close. During the intervals a small silver drain-tube should be worn to prevent premature closing, the tube being removed to allow of the fountain-tube being introduced at each washing. I have not, as a rule, experienced any trouble from food passing into the antrum either through an opening in the tooth-socket or canine fossa; but should it do so, a cap can be fitted to the proximal end of the tube. In some cases irrigation and drainage is not sufficient. An astringent lotion, as sulpho-carbolate of zinc, may then be employed, or after each washing out with the boracic solution iodoform or iodol or boracic acid powder may be blown in. If the catarrh

does not cease, or if from the first the fluid returns slightly offensive, or in the intervals of the washing offensive fluid collects, the opening should be enlarged, and a search made with the probe or finger for necrosed or carious bone, an exposed and carious tooth-fang, exuberant granulation, or polyp of the lining membrane. A tooth-fang or necrosed bone or polypi must, of course, be removed. Prominent granulations or diseased condition of the mucosa may be treated by curetting. If the natural opening into the nose is obstructed, it may be advantageously enlarged, thus establishing a through drain. I have not hitherto had occasion to do this.

2. Purulent Catarrh of the Ethmoidal and Sphenoidal Sinuses.

Dr. F. H. Bosworth says that during the past five years he has met with ninety-seven cases of ethmoidal disease in his private practice, and of them twenty-seven were suppurative. It would appear, therefore, that purulent catarrh of the ethmoidal sinuses is not uncommon in America. From personal observation I should say that in this country it is a rare condition. As in purulent catarrh of the antrum there is an intra-nasal discharge of canary-yellow pus. When the anterior sinuses are chiefly affected, the pus is seen to escape from beneath the middle turbinal body, but as a rule from nearer the anterior end of that body than in antral disease. The upright position, moreover, favours the flow, whereas, when the antrum is involved, depression or lateral inclination of the head, as before stated, generally increases the discharge. The pus is perhaps usually foetid, and the foetor not intermittent. Emphysema of the orbit may occur. When the stress of the affection falls upon the posterior sinuses or the sphenoid cells, the pus either passes posteriorly into the naso-pharynx, or, if it escapes anteriorly, passes through the superior meatus, and hence flows over the inner surface of the middle turbinal, *i.e.*, between the middle turbinal and the septum. When entering the naso-pharynx it may be seen escaping from the superior meatus with the rhinoscope. The middle turbinal may appear swollen or cedematous, or the mucous membrane covering it present a polypoid condition, or actual mucous polypi may be present. The pus may continue to escape into the nose, or, under the use of suitable medication, cease to be formed, or the cells may become distended, their septa broken down, and one or more large cavities formed, as described by Zuckerkandl and others. The inner wall of the orbit may then become absorbed, and a fluctuating swelling form near the inner canthus of the eye. On pressure on this

swelling the escape of pus may be promoted, and the swelling become flaccid or less tense. On the other hand, when the posterior cells or the sphenoidal sinuss are involved, pressure may be exerted on the optic nerve, or the nerves entering the orbit by the sphenoidal fissure, and ptosis, squint, protrusion of the globe, emphysema of the orbit, or sudden blindness may then occur. I have had no personal experience of these symptoms, and shall not further refer to them.

Treatment.—In some of these cases the removal of polypi or a portion of the middle turbinal, and the persistent use of sprays, are, I am convinced, sufficient, but in other cases a free drain must be established. Where a fluctuating swelling has formed near the inner angle of the orbit, probably the safest method is to drain through this. But where no protrusion has here occurred, it is a question whether an external opening should not be made in this situation. I have not myself used the dental engine to lay open the ethmoidal cells from within the nose, but its use is highly commended by Bosworth. Most of us, I imagine, would prefer the curette or sharp spoon, since these instruments in the hands of most of us would probably be better under control. Even in the hands of a skilled dentist I have known the dental engine to give a very nasty dig, and I would certainly not trust our own hospital surgical engine in the region of the cribriform plate.

3. *Purulent Catarrh of the Frontal Sinuses.*

Purulent catarrh of the frontal sinusses is less often met with than either antral or ethmoidal disease. In the few cases I have seen, in addition to the escape of pus over the anterior end of the middle turbinal, there has been frontal headache, with slight tenderness on pressure, and, in some, œdema or actual swelling over the sinusses or a fistulous tract leading into the cells. Where swelling or a sinus is present, the diagnosis is of course clear, but this is not the class of case with which I am now dealing. Where there is no external sign, the only way to confirm a probable diagnosis is to actually detect the pus in the cavity. This may be done by passing a cannula into the sinus through the infundibulum or by exploration from without. The latter method is objectionable in that some scar must be left, and should not be resorted to unless an attempt has been made to catheterise the sinus from the nose. This can be accomplished, according to several authorities, in fifty or sixty per cent. of the cases in which it is tried. Jurasz found it quite easy in five cases, difficult in six, and impossible in ten. On

the dead body it is probably more difficult than on the living, since the fronto-nasal canal has a tendency to become dilated in frontal catarrh. The removal of the anterior end of the middle turbinal, which overlies the opening of the infundibulum, facilitates the passage of the catheter.

Treatment.—Medicinal treatment and time having failed to relieve or cure the catarrh, the sinuses must be opened and drained. If a catheter can be forced through the infundibulum, the sinuses should be systematically irrigated with antiseptic or astringent lotions by the natural aperture; or, if this is insufficient, the natural passage may be cautiously enlarged, or the lower wall of the sinus partly removed. The proximity of the cribriform plate should not be forgotten in the performance of this operation. It has been perforated with a fatal result. If it is not wished to attempt perforation of the floor of the sinuses by the nose, they may be opened by an external incision, either by the chisel or trephine. A free passage into the nose may then be established, should the existing passage appear too small, by working from above downwards from the sinus to the nose; but even this procedure should not be undertaken lightly. With regard to these operations for the laying open of the frontal, ethmoidal, and sphenoidal sinuses, I would here repeat what I have said elsewhere, that they should not be undertaken, seeing with how much risk they are attended, until judicious constitutional treatment, with such milder measures as spraying, and attempts at washing out through the natural apertures have been systematically tried; nor until time, which alone will often do so much, even in spite of the surgeon, for the alleviation or cure of the disease, has been given for the morbid process to subside.

A CASE OF AURAL PYÆMIA,

IN WHICH

THE SINUS WAS NOT BLOCKED BY THROMBOSIS, BUT THE
JUGULAR VEINS WERE LIGATURED: THE SINUS,
TEMPERO-SPHENOIDAL LOBE, AND CERE-
BELLUM BEING EXPLORED AT THE
SAME TIME BY DEAN'S METHOD.

BY

CHARLES A. MORTON.

In these Hospital Reports for last year (1893), Mr. Walsham records a case of pyæmia from middle ear disease, in which the lateral sinus was not thrombosed, but an extra-dural abscess was found in contact with it. The sinus was plugged and the internal jugular vein ligatured, and the patient recovered. Mr. Walsham remarks, "That notwithstanding the absence of thrombosis, it seems probable there might be a small septic patch in the wall of the sinus contiguous to the suppurating mastoid antrum, and that this was the source of the septic material which was evidently entering the circulation." Such was the condition in the case which I now record. There was pyæmia associated with suppurative otitis media; the lateral sinus was not blocked by a thrombus, but the jugular veins were ligatured. Pyæmic temperature ceased for three days after ligature of the veins, but a splenic abscess ruptured into the peritoneum, and the boy died of peritonitis. At the post-mortem the sinus still contained fluid blood, and only a narrow cord of septic clot, though there was a purulent thrombus in the orifice of the jugular vein. But although there was only such incomplete thrombosis of the sinus, pus was found between it and the bone, and the wall of the sinus was much softened. The fact that the sinus was not blocked by thrombus at the time of operation

was no indication that septic infection of the vein had not occurred.

Mr. Arbuthnot Lane records¹ three cases of aural pyæmia in which at the time of operation there was no thrombus in the sinus. In one case the vein was not ligatured or the sinus plugged, and, as shown by the post-mortem, no thrombosis occurred at any time. In the other two cases Mr. Lane tied the internal jugular vein. One of these recovered, and in this case thrombosis in the sinus followed ligature of the vein within three days. In the other case, which was fatal, three days after operation the sinus was explored and found still free from thrombus, but on the child's death, sixteen days later, clot was discovered in the sinus, which had spread by way of the superior petrosal to the cavernous sinns.

I cannot find records of any cases where Mr. Ballance's valuable suggestion,² to plug the sinus as well as ligature the vein in cases of aural pyæmia without thrombosis of the sinus or vein, has been carried out with deliberate intention. In a few cases the vein has been ligatured and the sinus then plugged because it has been laid open under the supposition that it was thrombosed. One such case has already been referred to. Another is recorded by Mr. Vickery,³ in which the iodoform gauze-plug was placed outside the sinus. In this case several rigors followed the operation, and an abscess formed in the hand, but the patient eventually recovered. Mr. Ballance last year recorded a case,⁴ on which he had just operated, in which he found a thrombus in the vein when he ligatured it, but on freely laying open the vertical portion of the sinus, found no thrombus there, and blood freely flowed from the distal end. This free opening was made with the intention of plugging the sinus even though not thrombosed, and the treatment was successful. The young man had been ill for eight days with typical sinus pyæmia. Ballance points out that had he been content simply to explore the sinus with a grooved needle, and on such evidence of the absence of septic thrombus abstained from ligature of the vein and plugging the sinus, the patient's life would almost certainly have been lost. Had I to operate again for aural pyæmia without evidence of septic clot in the sinus, I should certainly lay the sinus open and plug it, as well as ligature the jugular veins; and I should follow the suggestion of Mr. Hugh Jones,⁵ to cut away the bony wall of

¹ Brit. Med. Journal, 1893, vol. ii. p. 561.

² Lancet, 1890, vol. i. p. 1114.

³ Brit. Med. Journal, 1893, vol. ii. p. 1144.

⁴ Clin. Journal, 1893, vol. ii. p. 366.

⁵ Brit. Med. Journal. 1893, vol. ii. p. 1144.

the sinus far back, so as to make pressure on the distal portion of the sinus to control the circulation in it, and then freely open the sigmoid part and plug it. And I would suggest that we specially plug very thoroughly the lowest portion of the sigmoid part of the sinus, where it enters the internal jugular vein, for here some channels of possible infection leave the sinus—the communicating branch between the sigmoid sinus and the occipital sinus (sometimes called the marginal sinus) and the posterior condylar vein when present. Possibly, in my own case, if the sinus had been freely opened and plugged, a clot at the orifice of the internal jugular vein would have been detached—pushed on into the vein—but this would have been of little importance as the vein was already tied.

A boy ten years of age was admitted into the Bristol General Hospital, under the care of Dr. Michell Clark, on April 16, 1894, with the following history. A year ago he attended the out-patient department with otorrhœa, but whether the condition persisted during the year was doubtful. Five days before admission he began to suffer from pain in the left ear and frontal headache, and this continued up to the time of admission. For the last two days he had suffered from frequent vomiting. Otorrhœa had not been noticed during his illness. There had not been any rigor. He had always been mentally dull.

On admission the headache persisted—he cried if his head was moved—but there was no vomiting. Otorrhœa was not present. His evening temperature was 100.8° . On the following day, April 17, I saw him with Dr. Clark. He was dull and heavy, but the headache had gone. Very offensive discharge had occurred from the left ear. His temperature was just below 100° ; there had been no rigor. The ear was frequently syringed with carbolic lotion and iodoform blown into it. In the evening, however, his temperature rose to 101.6° , and so on the following day, the 18th, he was transferred to my care, and I drilled the mastoid antrum. Very offensive thick pus flowed from it, and much débris of soft tissue and one speck of loose dead bone were removed. Although a probe passed into the antrum freely touched another passed in through the external auditory meatus, fluid would not flow through; but the antral cavity was well syringed out with carbolic lotion and padded with iodoform gauze and iodoform. The temperature fell to normal just before the mastoid was drilled, and remained so for forty-eight hours, and he continued free from symptoms until midnight between the 19th and 20th, when he began to vomit, and vomited four times before morning. When I saw

him at mid-day on the 20th, he was very restless and talkative. When asked where he had any pain, he pointed to the left frontal region. At 2 P.M. his temperature rose, but only to 100.2°. His pulse was 160. Respirations, 60. There was no cough and no physical signs of disease in the chest. The vomiting did not recur, and next day (the 21st) he seemed better. His temperature in the morning was again only 100.2°, and in the afternoon and evening normal. The discharge persisted both from the mastoid opening and the meatus. By means of a very fine india-rubber tube passed well into the antrum, fluid could be freely syringed from the antrum out of the meatus, bringing some purulent discharge with it. This was done every few hours. On the following day (22nd) his temperature was normal all day and he seemed better, but he had a very restless night and his temperature rose to 102°, and next day (23rd), though the temperature fell to normal in the afternoon, he was drowsy. There were no signs of optic neuritis and no vomiting. When seen again on the 24th, he had passed a better night, was less drowsy, and seemed free from pain, but when asked, said he had pain in the ear. In the afternoon, however, he had the first high rise of temperature—to 104.2°, but there was no rigor. It quickly fell to normal. This caused the first suspicion of pyæmia. In the night there was another temporary rise to 104.6°. When seen at noon next day (25th), he was rather drowsy. There were no physical signs in the chest, and no joint or subcutaneous swellings. Pain in the head was not present. There had been no rigor, only the pyæmic temperature. For the last twenty-four hours he had complained of abdominal pain, and I thought there was some tenderness there, but he was in too irritable a condition to determine this accurately. There had been no vomiting. At 3 P.M. he became very blue, and complained of feeling cold, but his temperature was normal. A quarter of an hour later it had risen to 101.6°. This was the nearest approach to a rigor the boy had. There was no swelling over the internal jugular vein, but it was evident from the temperature that pyæmia was present, and I thought the lateral sinus ought to be explored, and perhaps the tempero-sphenoidal lobe and the cerebellum at the same time. This I did from one opening in the skull, as advocated by Dean.¹ The operation was begun almost directly after the temperature of 101.6° above referred to was taken. I turned down a large flap from the mastoid region and then removed a disc of bone $\frac{3}{8}$ inch in diameter,² the pin of the trephine

¹ *Lancet*, 1892, vol. ii.

I used so small a trephine in order not to include the mastoid opening.

being placed $\frac{7}{8}$ inch behind the centre of the meatus in Reid's base line, and $\frac{1}{4}$ inch above the line. The sigmoid portion of the sinus seemed to lie beneath, but the opening was small, and in order better to define the outline of the sinus, I cut away more bone with Hoffman's forceps backwards. On withdrawing the beak of the forceps from under the skull, venous blood flowed freely, apparently from some wound of the sinus, and yet the beak was too blunt to wound the sinus. Almost certainly the mastoid vein was torn by the separation of the dura mater from the bone, and the bleeding came from it. The space between the bone and dura mater was plugged with a minute portion of sponge, and the bleeding readily controlled. I then removed another disc of bone from just above it, of the same size as the first; this exposed the upper bend of the sinus, and to make quite sure of its condition I passed a hypodermic syringe into it, withdrawing venous blood. The opening was extended upwards with the cutting forceps, and another disc of the same size was then removed just above the sinus, and through this the temporo-sphenoidal lobe was explored with negative result; and then with Hoffman's forceps the bone was cut away below the sinus and the cerebellum explored, also with negative result. In both cases the dura mater was opened so as to avoid any large vessel on the surface of the brain, and, as recommended by Macewen, a small aspirating trochar and cannula were used, the cannula being slowly withdrawn after the removal of the trochar. In this way the instrument could not get blocked by brain tissue, and pus would be reached at any distance from the surface, as the cannula was slowly withdrawn.

Although there was no evidence of the septic clot in the sinus, it seemed to me that ligature of the internal jugular vein still gave him the best chance, and I tied first the external jugular because of the free communication which takes place between the two in the parotid region. I tied the internal jugular at the level of the cricoid cartilage. There was no sign of thrombosis in it. The little piece of sponge was then removed from between the bone and dura mater and a cyanide gauze plug inserted. He was not so cyanosed after the operation as before, and his pulse was fairly good at the end. He passed a less restless night, and on the following day (26th) was less drowsy. There was no sickness or headache, and his temperature did not rise again for twenty hours, but then it quickly went up to 103° , and as quickly fell to normal. The opening into the mastoid antrum was separated from the sinus opening by iodoform gauze and powdered iodoform. The little

cyanide gauze plug was removed from the neighbourhood of the wound without any further bleeding. He had another rise of temperature to 103° on the 27th, and then the temperature remained below 100° until the night of the 30th (three days), when it rose again to 103° , and he died five days after the operation. During this time there was varying pain and tenderness and distension of the abdomen, and on some days frequent vomiting. On the 28th there was friction at the right axillary base. The almost normal temperature which lasted for three days was encouraging after the occurrence of two pyæmic rises to between 104° and 105° , and had not an abscess, already formed in the spleen, caused general suppurative peritonitis by its rupture, promised, I think, a fair chance of the boy's recovery.

Post-mortem.—The sinus contained liquid blood and a narrow post-mortem clot. Between the wall of the sinus and the outer wall of the mastoid forming part of its groove was a layer of pus and lymph, and the wall of the sinus was so soft here over an area the size of a pea it could be picked out with forceps. The bone beneath the softened wall of the sinus was the wall of the antrum, which was very thin. On holding the bone against a strong light, two very minute perforations were seen in it. At the entrance of the sigmoid sinus into the jugular vein, pus was seen on opening up the sinus. This pus was in the centre of a clot which occupied the upper half inch of the jugular vein. A very narrow white clot stretched from the eroded part of the sinus down to this. There was no meningitis, cerebral or cerebellar abscess.

On opening the abdomen, general suppurative peritonitis was discovered, due to rupture of a small surface abscess of the spleen.

There was some recent lymph on the base of the right lung, but no effusion. No infarcts were present in the lungs. The heart and kidneys were normal.

BLOOD-CASTS IN PHTHISIS.

BY

SAMUEL WEST, M.D.

Bronchial casts are of two kinds, viz., fibrinous and blood. Fibrinous casts are very rare in phthisis. A closer relation between phthisis and plastic bronchitis has been assumed than really exists, probably because of the frequency with which hæmoptysis occurs at the time the bronchial cast is expectorated; but hæmoptysis may occur in plastic bronchitis, and even be profuse in patients who are not at the time, and never become phthisical; and, on the other hand, when phthisis is associated with plastic bronchitis, there may be no hæmoptysis.

The statistics I have already published show that in eighty-three cases of plastic bronchitis, phthisis was actually demonstrable, or might be fairly assumed to exist, in fourteen instances only, *i.e.*, in 16 per cent. In Wilson-Fox's series of fifty-one cases, phthisis was found in seven, or 14 per cent.; of these, four were fatal, in three of which recent tuberculosis was found, and in the fourth, chronic phthisis.

Blood-casts in phthisis are very rare. Indeed, Peacock denied their existence entirely. They certainly occur, and I have myself seen two or three instances. The most remarkable of them was exhibited by me to the Pathological Society in 1880.

A man, aged forty-three, under treatment for phthisis, had two or three attacks of hæmoptysis, in one of which he brought up some "lumps," which he had expectorated with very great difficulty, but with great relief to the dyspnoea, with which his hæmoptysis had been associated.

Four of the casts were shown to the Society; three were of about the same size, viz., about two inches long, and a quarter of an inch in diameter at the thickest part of the stem. Two of them were much branched. The fourth cast was much larger, being of the size and shape of the little finger, $1\frac{1}{2}$ inches long, and $\frac{1}{2}$ inch in diameter. This was not branched. The patient was under observation for twelve months later. He spat no more casts. He died at home about three years subsequently.

Fagge states that there is a specimen in Guy's Hospital Museum of a large branched clot, expectorated a few days after

hæmoptysis. A case is also given in abstract in Virchow's *Jahrbuch*, 1885, ii. 152, occurring in a phthisical dyspeptic who had had several attacks of hæmoptysis. Cheyne,¹ who described blood-casts in 1809, stated that they were the precursors of fatal hæmoptysis, and he quotes a case in support of his statement.

Small casts I have seen on two other occasions in phthisis. The most interesting of these two cases occurred in a man of forty-six, who had emphysema and also slight consolidation at the apex. He had several attacks of hæmoptysis while under observation, and he brought up small clots (bronchial casts) on two occasions. On the first he brought up about thirty small ones in the course of two days; on the second, only two or three. The blood was at first bright, and when the clots came it was dark.

Pomies² also records a case in which a large clot was brought up from the large bronchi of the left side, and quotes also another case in the practice of Gintrac.

¹ Pathology of the Membrane of the Larynx and Bronchi, 1809.

² Lyon. Med., 1872, x. 99.

PROCEEDINGS
OF
THE ABERNETHIAN SOCIETY
FOR THE SESSION 1893-94.

OFFICERS.

<i>Presidents</i> . . .	Mr. R. BROWN and Mr. E. H. E. STACK.
<i>Vice-Presidents</i> . . .	Mr. W. H. MAIDLOW and Mr. C. W. GRANT.
<i>Secretaries</i> . . .	Mr. J. CURRIE and Mr. R. C. J. STEVENS.
<i>Additional Committee-men</i>	Mr. S. P. HUGGINS and Mr. H. W. LANCE.

July 13.

The Midsummer Meeting was held, Mr. Stack, President, in chair.

Sir Dyce Duckworth read a paper on 'Clinical Aptitude,' which was full of helpful advice for men about to begin ward work.

A vote of thanks was proposed by Mr. Grant, and seconded by Mr. Dunn.

October 12.

Introductory Address was delivered by Mr. Henry Power, Mr. Stack, President, in the chair, before a large attendance of members and nurses.

A resolution was passed that the address be printed, and a vote of thanks to Mr. Power was carried.

October 19.

First ordinary meeting, Mr. Stack in the chair. Mr. Maidlow read a paper on 'Electrical Department Cases.'

These he divided into paralysis, painful affections, tinnitus aurium, tumours, bladder cases, including urethral stricture, suspended animation due to CHCl_3 , and medico-legal points of interest, all of which he discussed in order.

A long discussion took place afterwards.

October 26.

Second ordinary meeting, Mr. Stack in the chair.

Mr. Hoyle read notes of a case of scarlet fever, the diagnosis of which was rendered difficult from the presence of syphilis.

Dr. Collins then gave an interesting address on the medical work of the London County Council, which included custody of lunatics, inquests, contagious diseases of animals, disposal of sewage, open spaces, building of artisans' dwellings and markets; he made special mention of the work of the Public Control Committee, of which he was a member, which included, amongst other things, constant water supply, insurance of infant life, and smoke nuisances.

A brisk discussion followed.

November 1.

The first clinical evening of the session was held, Mr. Stack in the chair.

One hundred and twenty-four members were balloted for and elected.

Mr. Buck showed a case of hydrops articuli in both knees of a child.

Mr. Attlee showed a case of xanthoma, a case of conjunctivitis due to ipecacuanha dust, and a case with a curious anatomical arrangement of the soft palate.

Mr. Maidlow showed a case of morphea, and one of osteoarthritis.

Mr. Paterson showed a case of disease of the elbow-joint, and Mr. Stubbs showed specimens with the polariscope.

November 9.

The third ordinary meeting was held, Mr. Brown in the chair. Cases were shown by Mr. Maidlow and Dr. Weber.

Dr. Weber read a paper on 'Atheroma of the Aorta, its relation to Arterio-Sclerosis, and the intermittent "Claudications" caused by it.'

He defined intermittent claudications.

November 16.

The fourth ordinary meeting was held, Mr. Maidlow in the chair.

Dr. Browne read a deeply interesting paper on the 'Care of the Dying,' in which he dealt with the question of the advisability of letting a dying person know his condition, and mentioned points in reference to their bodily comfort.

A discussion followed.

November 22.

The fifth ordinary meeting was held, Mr. Stack in the chair.

Mr. Reginald Brown read an interesting paper on 'The Exigencies of Private Practice,' which was followed by a most interesting and amusing discussion.

November 30.

The sixth ordinary meeting was held, Mr. Stack in the chair.

Dr. Ormerod read a valuable paper on 'Post-Febrile Paralysis,' in which he asked to be allowed to include paralyzes occurring during fevers.

The paper was followed by a discussion.

December 7.

The seventh ordinary meeting was held, Mr. Stack in the chair.

Mr. Attlee showed a case of congenital dislocation of both lenses.

Dr. Kanthack then read a very able paper on 'Tuberculosis as an Infective Disease.' He dwelt at some length on the

methods of prevention of the spread of the disease. He deprecated interference in the marriage laws, or the process of segregation, as being both unreasonable and impracticable.

A discussion followed.

December 14.

The eighth ordinary meeting was held, Mr. Stack in the chair. Three gentlemen were balloted for.

Mr. Berry read a most instructive paper on 'Goitre' before a very large attendance, which he illustrated with maps and diagrams of the areas of the disease, and photographs of diseased persons. He unfortunately could not allow the paper to be published by the Society, as he intended it to form part of a new book on the subject.

An interesting discussion followed.

January 11, 1894.

The mid-sessional meeting was held, Mr. Reginald Brown in the chair.

Mr. Bowlby gave an interesting address on 'Recreation,' which was afterwards published in the Journal.

January 18

The ninth ordinary meeting was held, Mr. Maidlow in the chair.

Four gentlemen were balloted for, and elected members.

Mr. Maidlow showed a case of congenital sinus in the neck, which he considered was a relic of the fifth branchial cleft.

Dr. Shore then read a most interesting and instructive paper on the 'Evolution of Medicine and Medical Teaching,' in which he traced the development of medicine and the allied sciences from the earliest times down to the present.

A discussion took place afterwards.

January 25.

The tenth ordinary meeting was held, Mr. Maidlow in the chair.

Two gentlemen were elected, and three admitted members of the Society.

Mr. Shuter showed a boy with cholestrin crystals in the vitreous after an old injury.

Mr. Eccles showed a third costal cartilage which was bifurcated at its sternal end, the sternum at the attachment of the cartilage being also bifurcated.

Mr. Eccles then read a paper on 'Acute Intussusception,' defining the condition, and dwelling especially on the treatment.

The paper was followed by a discussion.

February 1.

The eleventh ordinary meeting was held, Mr. Reginald Brown in the chair.

Mr. Maidlow showed a case of bifid terminal phalanx in the thumb of the right hand.

Mr. A. F. Stevens showed a woman with an eruption on both hands, the diagnosis of which was doubtful.

Dr. Garrod then read an instructive paper on the 'Causation of Rickets,' dealing with predisposing and exciting causes. Amongst the former he discussed—(1.) Locality, (2.) Bad hygiene, (3.) Ill-health of the mother during pregnancy, (4.) Diseases of the child impairing nutrition.

A brisk discussion followed.

February 8.

The twelfth ordinary meeting was held, Mr. Stack in the chair.

Four gentlemen were balloted for, and duly elected members of the Society.

Mr. Cumberbatch read a most useful paper on 'Intracranial Complications following Middle Ear Disease.'

He alluded to the great frequency of middle ear disease, and the carelessness with which it is commonly regarded, and then proceeded to discuss the various ways in which extension of the inflammatory process may endanger life. He then went on to the differential diagnosis and treatment of these secondary lesions.

Mr. Cumberbatch illustrated his paper with numerous specimens and charts.

A long discussion followed.

February 15.

The thirteenth ordinary meeting was held, Mr. Stack in the chair.

Dr. Herringham read a paper on the 'Pulse.'

February 22.

The fourteenth ordinary meeting was held, Mr. Stack in the chair.

Thirty-three gentlemen were balloted for, and elected members.

Dr. Batten read a paper on 'Some Unusual Manifestations of Tubercular Meningitis.'

March 1.

The fifteenth ordinary meeting was held, Mr. Stack in the chair.

Dr. Hayward read an able paper on 'Diphtheritic Sore Throat,' in which he entered very fully into the bacteriology of the disease.

A discussion followed.

March 8.

The sixteenth ordinary meeting was held, Mr. Reginald Brown in the chair.

Dr. Roberts read an interesting paper on 'The Present Position of Symphysiotomy.' He traced the history of the operation, and mentioned cases in which it had been performed; he then went on to discuss the amount of space gained by separation of the pubic bones, and gave his experiences of the operation when done on the cadaver. This paper is published in the present volume (p. 27).

A discussion ensued.

March 22.

The Annual General Meeting was held, Mr. Stack, President, in the chair.

Mr. Maidlow and Mr. Meakin were appointed auditors of the accounts.

The report of the outgoing Committee was read and adopted.

The balance sheet was read and passed.

The names of officers elected for the ensuing year were then read:—

Presidents—Mr. W. H. Maidlow and Mr. E. W. Cross.

Vice-Presidents—Mr. J. S. Sloan and Mr. R. C. J. Stevens.

Treasurer—Mr. Alfred Willett, F.R.C.S.

Secretaries—Mr. F. A. Smith and Mr. A. Pain.

Additional Committee-men—Mr. H. D. Everington and Mr. R. H. Beveridge.

DESCRIPTIVE LIST
OF
SPECIMENS ADDED TO THE MUSEUM
DURING THE YEAR 1894.

SPECIMENS ADDED TO THE MUSEUM

During the Year ending September 30, 1894.

DESCRIBED BY

EDGAR WILLETT.

SERIES I.

DISEASES OF BONE.

TUBERCULAR DISEASE.

121a. The head of the Right Femur of a child aged one year, which has been cut across by an oblique incision. It is composed almost entirely of cartilage, in the centre of which is a small cavity containing caseous matter of tubercular origin.

From a well-nourished male child who died of broncho-pneumonia. He had complained of pain in the joint for about a fortnight, though nothing could be made out by palpation. At the *post-mortem* examination the right hip-joint was found to contain pus which tracked up in the sheath of the psoas.

Presented by W. P. Herringham, M.D.

SYPHILIS.

312e. The upper end of the Right Ulna, from the same case as the four preceding specimens (Nos. 312 a-d). There is much overgrowth of the synovial membrane, so that it forms extensive fringes which hang down and protrude into the joint. The periosteum is separated from the back part of the olecranon process, leaving the bone bare and roughened, and a similar condition exists over the coronoid process. The cartilage covering the greater sigmoid notch appears fibrillated and grooved in a longitudinal direction; in places it is eroded. The joint contained some opalescent fluid, but no pus.

See *Male Surgical Register*, vol. v. (1886), No. 2691*, and *Surgical Post-Mortem Register* (1886), pp. 22-32.

SARCOMA.

- 446f. One half of the upper end of a Right Humerus which has been sawn through longitudinally to fully expose a large Sarcoma of the neck of the bone. The tumour involves the whole circumference, and a spontaneous fracture has resulted on the posterior surface. The circumflex nerve is seen running in a wide groove round the neck of the bone.

From a man aged 47, who had noticed the swelling for eight weeks. The pressure of the tumour caused most intense pain. A secondary growth existed in the substance of the flexor carpi ulnaris of the same side (see Specimen No. 1174e). The arm was removed by amputation at the shoulder-joint. He recovered from the operation and left the Hospital three weeks afterwards. Microscopical examination showed that the tumour was a spindle-celled sarcoma.

See *Male Surgical Register*, vol. v. (1893), No. 32.

ENDOSTEAL SARCOMA.

- 475c. One half of the lower two-thirds of a Right Femur sawn through longitudinally to show a very extensive Sarcoma; the new growth, starting at about the junction of the middle and lower thirds of the shaft, has extended forwards and caused complete absorption of the front wall, with great bulging of the periosteum for over four inches. It also extends downwards and upwards within the medullary canal. Although the posterior surface of the shaft is involved and eroded, fracture has not occurred. Microscopical examination showed the tumour to be an oval-celled sarcoma.

From a man aged 21, who gave a history of pain and swelling in his leg for three months.

See *Male Surgical Register*, vol. iv. (1893), No. 675.

SERIES II.**DISEASES OF JOINTS.****OSSIFICATION OF SYNOVIAL MEMBRANE.**

- 569d. One half of a Patella and of the Synovial Membrane of a Knee-Joint laid open by a longitudinal incision. The synovial membrane has undergone, in the first place, a great dilatation upwards along the anterior surface of the femur. This has been followed by a remarkable thickening and subsequent ossification, so that it now measures more than half an inch in thickness in some places. The cavity of the joint is not obliterated, and its lining membrane is still smooth and covered by endothelium, although the surface is slightly nodulated. Microscopical examination showed that the changes undergone have resulted in the formation of true bone.

The specimen was removed by the operation of excision from a young man aged 26. He received an injury to his left knee twelve years previously, since which time he had suffered more or less continuously.

For a full history of the case, see *British Medical Journal*, vol. i. (1894), p. 957.

Received in exchange from the Pathological Museum of Cambridge.

DOUBLE HIP-DISEASE.

- 622a. The Upper Epiphyses of the Right and Left Femur, which separated, and were removed after suppuration had occurred in both hip-joints.

From a boy aged 9. He recovered and left the Hospital.
See *Male Surgical Register*, vol. i. (1894), 194*.

BONY ANKYLOSIS.

- 663a. The Right Os calcis, Astragalus, and Scaphoid, all firmly united together by bony ankylosis. With the exception of the external articulation between the os calcis and astragalus, all the joints between the three bones are entirely obliterated.

From the Dissecting-Rooms.
[In Case G.]

RHEUMATIC ARTHRITIS.

- 673d. A Trapezium and the Bones of the Thumb of a Right Hand showing changes in the joints due to Rheumatic Arthritis. The carpo-metacarpal joint is the most affected; in it the cartilages have entirely disappeared from both articular surfaces, leaving the bones rough and bare. There is also a considerable amount of "lipping" from the deposit of new bone around the margins of the joint.

From a subject brought to the Hospital for dissection.

CHARCOT'S DISEASE.

- 691e. The Bones of the Left Ankle and Foot of a man who died from Locomotor Ataxia, exhibiting in a marked degree the changes occurring in Charcot's disease. The ankle-joint is the part most affected; the astragalus is necrosed and porous, and shows great destruction and erosion of bone-substance, particularly on the inner and front aspects. The surface articulating with the scaphoid has disappeared. The lower extremities of the tibia and fibula are united by numerous light and porous osteophytes, and have both lost their smooth articular surfaces. There is a large shallow excavation on the outer surface of the os calcis, caused by contact with the lower end of the fibula, against which in the recent state it rubbed, owing to the great laxity and destruction of the ligaments. The bones of the tarsus and the heads of the metatarsals are all roughened and porous, while the phalanges of the great and little toes show destruction and absorption of bone due to former perforating ulcers, which had healed some time before death.

From a man aged 43, who suffered from tabes dorsalis, and who died in the Hospital. The anterior part of his right foot, showing the old scars of perforating ulcers, is preserved in Series I., No. 323c.

See *Male Surgical Register*, vol. iv. (1843), No. 71.
[In Case G.]

- 696b. The lower end of a Left Femur, with the Patella, showing changes due to Rheumatic Arthritis. The upper surface of the external condylē has been denuded of cartilage, and the subjacent bone is eburnated and polished, and is marked longitudinally by a deep groove, into which fitted

a prominent ridge on the patella, which has also lost its cartilage from this situation. The edges of the patella, and of the articular cartilage on the internal condyle are uneven, and nodulated from the growth of several osteophytes; the largest of these has become detached, and is now suspended above the bones. It is quite hard and bony; several thin fringes hang from other parts of the synovial membrane.

From the Dissecting-Rooms.

INTERNAL DERANGEMENT OF KNEE-JOINT.

117b. An Internal Semilunar Cartilage removed by operation from a right knee-joint on account of recurring attacks of synovitis, with "locking" of the joint.

See *Male Surgical Register*, vol. ii. (1894), No. 1263.

SERIES III.

INJURIES OF BONE (FRACTURES).

821a. One half of the Left Femur of a child aged four months, who died about four weeks after sustaining a simple fracture of the bone. Union has taken place, but with very considerable deformity. The upper fragment is displaced, so that it now lies above and in front of the lower, and is united to it, almost at right angles, by provisional and ensheathing callus. The medullary canal of the upper fragment is already closed, and the sharp edges are rounded off. There is little or no rotation.

See *Surgical Post-Mortem Register* for 1892, p. 155.

821b. One half of the Left Femur of a child aged seven months, who sustained a simple fracture of the bone eleven weeks before death. The specimen has been sawn through longitudinally to show the condition of the fragments. The fracture occurred at about the middle of the shaft. As is usual, the upper fragment has been displaced in front of the lower, and there is a considerable amount of shortening. The medullary canal of both fragments is closed; the sharp edges of the fragments are smoothed down, and there is firm bony union by provisional callus.

See *Female Surgical Register*, vol. iii. (1893), No. 441.

SERIES V.

DISEASES AND INJURIES OF THE SPINE.

CHRONIC RHEUMATIC ARTHRITIS.

1085a. The Lumbar Vertebrae and Sacrum showing changes due to Chronic Rheumatic Arthritis. The margins of all the lumbar vertebrae are lipped and greatly increased in breadth from the presence of osteo-

phytic growths; the bodies of the vertebræ also show numerous stalactytic processes. On the left side is a mass of new hard bone firmly uniting the second, third, and fourth vertebræ at the place where the psoas muscle is attached to these bones. The spinous and transverse processes are not affected.

From a man aged 60, who died from carcinoma of the rectum.
See *Male Surgical Register*, vol. ii. (1893), No. 2466.
[In Case G.]

SERIES VI.

DISEASES AND INJURIES OF MUSCLES, TENDONS, AND BURSÆ.

RUPTURED ADDUCTOR LONGUS.

- 1169a. A Right Adductor Longus Muscle, removed by operation owing to a rupture of its femoral insertion some months previously. The muscle now forms a globular mass, and though much wasted, could be readily made to contract by an effort of the will.

From a man aged 20, who had been employed as a rough-rider in a cavalry regiment. He first felt pain and noticed a swelling in the upper and inner part of his thigh one year before he was admitted into the Hospital; he had then been invalided out of the army. It was removed at his request because of its unsightly appearance and the inconvenience it caused. The corresponding muscle of the left thigh was similarly injured, but to a less extent.

A cast of the upper part of the two thighs is preserved in Series lvi. No. 67b, and a photograph in Series lvii. No. 144a.

See *Male Surgical Register*, vol. iv. (1893), Nos. 3074 and 3228.

SECONDARY SARCOMA OF MUSCLE.

- 1174e. The muscular portion of the Right Flexor Carpi Ulnaris, which has been laid open to show a secondary deposit of a spindle-celled sarcoma.

The primary growth occurred at the upper part of the right humerus, which was removed by amputation at the shoulder-joint. It is preserved in Series I. No. 446f. to which refer for a history of the case; there were no other secondary growths.

UN-UNITED TENDON.

- 1198b. The distal portion of a Tendo Achillis, measuring two and a half inches in length, removed by operation from the os calcis after failing to unite with the proximal end.

From a young lady aged 20 who had ruptured her tendo achillis nine months previously. She was at once treated by massage and exercise, but failed to regain power over the foot. When seen by a surgeon, a rounded swelling was felt in the tendon just above the heel; this was explored and the necrosed end of the tendon found lying in a kind of thickened sheath. It was removed close to the os calcis and a good recovery followed.

Presented by Howard Marsh, Esq.

HAMMER TOE.

- 1203d. A Second Toe removed by operation on account of the discomfort caused by the deformity known as "Hammer Toe." It has been sawn through longitudinally to show the position of the bones at the joints. The first phalanx is over-extended, the second phalanx strongly flexed, while the unguis phalanx is extended on the second. Over the first inter-phalangeal joint a "corn," composed of fibrous tissue with a layer of thickened epithelium, has formed from the irritation of the boot.

From a young man aged 22. The deformity had gradually increased. No other members of his family suffered in a similar way.

See *Male Surgical Register*, vol. iv. (1892), No. 39.⁵

ENLARGED BURSA PATELLÆ.

- 1214b. One half of a Pre-patellar Bursa, greatly enlarged. It has been cut through longitudinally, and it is seen that the interior is filled up by dense fibrous tissue. A portion of skin has been left, in the centre of which is a large ulcer, leading down to the cavity of the bursa.

Removed by operation from a woman aged 37. The bursa had been enlarged for two and a half years.

See *Female Surgical Register*, vol. ii. (1892), No. 968.

SARCOMA OF BURSA.

- 1216b. A Bursa removed by operation from beneath the tendon of the biceps, on the outer side of the left knee. It has been laid open, and its cavity is seen to be filled by an irregularly lobulated new growth. Microscopical examination showed this to be a sarcoma, composed of round and spindle cells.

See *Male Surgical Register*, vol. iii. (1892), No. 66.

SERIES VII.**DISEASES AND INJURIES OF THE PERICARDIUM AND HEART.****PERICARDITIS.**

- 1225a. A Heart, the surface of which is uniformly covered with a soft, shaggy deposit of recently coagulated lymph, due to acute pericarditis. The heart is considerably enlarged, and weighed nine and a half ounces.

See *Medical Post-Mortem Register*, vol. xx. p. 321.

SOFTENING OF INTRA-CARDIAC THROMBI.

- 1278a. A Heart, the cavities of which have been laid open. In the apex of the left ventricle are a number of decolorised clots entangled among the muscoli papillares. Those which have been cut across have undergone a process of softening in the interior, so that they now resemble small cysts. They contained an oily fluid resembling pus, which when fresh

contained an abundance of micro-organisms, apparently staphylo-cocci. They lie loosely among the trabeculæ of the heart, and are easily separable; the endocardium does not appear to be in any way involved or ulcerated. The walls of the heart at the apex are somewhat thinner than usual.

It should be noted that there are four aortic cusps, one of which has been cut through in laying open the heart; of the three remaining, the middle cusp has a small perforation near its free margin.

There were no clots in the right ventricle.

From a young woman aged 28, who was admitted into the North-Eastern Fever Hospital as a case of Scarlatina. She developed double empyemata, and died from cardiac dyspnœa.

Presented by R. E. Scholefield, M.D.

- 1278b.** A somewhat similar specimen. Near the apex of the interior of the left ventricle is a hollow decolorised clot, propped open by a white glass rod. Its walls have undergone partial calcification. There are a few other similar but smaller cystic clots near that just described. The whole heart is considerably enlarged.

From a man who died from chronic phthisis.

See *Medical Post-Mortem Register*, vol. xx. p. 211.

SERIES VIII.

DISEASES AND INJURIES OF ARTERIES.

- 1384d.** A portion of the Popliteal Artery, of which the middle and internal coats have been ruptured as the result of a severe accident, which also caused a compound fracture of the femur. The vessel has been laid open, and it is seen that at the seat of the injury there is a firm conical clot, measuring one and a half inches in length, which is in places adherent to the vessel. The popliteal vein, seen at the back of the artery, has also been laid open and is partially filled by clot.

See *Male Surgical Register*, vol. ii. (1892), No. 512.

ANEURYSM ERODING VERTEBRÆ.

- 1532b.** A large irregularly lobed Aneurysm of the lower part of the Abdominal Aorta. It arises just below the renal arteries, and extends down nearly to the bifurcation, measuring over six inches in length. It involves all the coats of the vessel. The right side of the sac has been removed, together with the right half of the second and third lumbar vertebræ, to which the sac is adherent. The section shows that the interior of the sac contains a large mass of laminated blood-clot, and that the anterior half of the body of the third lumbar vertebra has been completely eroded. At this point there is no sac, the cancellous tissue of the bone here forming the posterior wall of the aneurysm; as

is usual, the inter-vertebral discs have not been eroded so much as the bones. At the lower part, and on the left side, the aneurysm formed a strong adhesion to the small intestine; this has been laid open. There is no communication between the sac and the intestinal canal.

Presented by Dr. Wood, per Henry Power, Esq.

SERIES IX.

DISEASES AND INJURIES OF VEINS.

VARICOSE VEINS.

- 1576b. Two portions of the Internal Saphenous Vein, removed by operation on account of their varicose condition. Both portions, especially the upper, are tortuous and irregularly dilated.

From a young man aged 19.

See *Male Surgical Register*, vol. iii. (1892), No. 1561.

- 1576c. A portion of the Internal Saphenous Vein, which has been excised, together with the superjacent skin, for the cure of a very marked varicose condition. The calibre of the vein is much enlarged, and forms a spiral containing seven complete turns. At the lower part there is in addition a further considerable pouch or bulging, involving the skin, which is here adherent and thinned.

See *Female Surgical Register*, vol. ii. (1893), No. 299.

THROMBOSIS (SEPTIC).

- 1578b. The upper part of a Left Internal Jugular Vein, which has been laid open longitudinally, thereby disclosing an adherent clot over two inches in length. The lower part is decolorised and adherent to the inner coat of the vessel, the calibre of which it only partially fills. At the upper part, however, the clot has entirely blocked the vein, and has subsequently "broken down," forming a long narrow abscess cavity, which contained foul pus: above this the walls of the vessel are much thickened.

From a man aged 48, who suffered from extensive syphilitic necrosis of the skull. The primary lesion occurred thirty years previously. There were no other signs of syphilis. He died from meningitis.

See *Male Surgical Register*, vol. ii. (1893), No. 2966*.

THROMBOSIS OF CEREBRAL SINUSES.

- 1589b. The upper part of the Dura Mater of a child, showing, on the cerebral surface, complete Thrombosis of the Superior Longitudinal Sinus, and of its tributary veins. The sinus has been laid open, and it is seen that at the posterior part the clot is more decolorised than in front, and that in this situation it is partially adherent.

From a little girl aged 3½, who had been ill with diarrhoea and vomiting for fourteen days. She became comatose, and died three days later.

See *Medical Post-Mortem Register*, vol. xx. 287.

GROWTH INTO VEINS.

- 1606b. Part of the Inferior Vena Cava, together with the abdominal aorta, and some enlarged lymphatic glands showing a Sarcomatous Growth projecting from the orifice of the right renal vein into the lumen of the vena cava. The lymphatic glands are also the seat of a secondary deposit of the disease.

From a woman aged 42, whose right kidney was removed by operation for sarcoma.

See *Female Surgical Register*, vol. iv. (1891), No. 1000.

SERIES X.

DISEASES AND INJURIES OF THE LARYNX AND TRACHEA.

DIPHTHERIA.

- 1616a. A Membranous Cast of the Trachea (measuring six inches in length), which was coughed up in two pieces during the course of a severe and fatal attack of Diphtheria; indentations corresponding to the rings of the trachea are clearly seen.

See *Radcliffe Ward Book* for 1893, Index No. 35.

- 1616b. A Membranous Cast of the lower part of the Trachea, of its bifurcation, and of the left bronchus, and its main branches, which was coughed up through a tracheotomy tube by a child during a severe attack of Diphtheria.

FOREIGN BODY.

- 1662c. A Feather over six inches long which slipped down a tracheotomy tube and remained in the trachea for five days without causing symptoms. It was then coughed up through the tube; it had been inserted by the patient.

See *Male Surgical Register*, vol. iv. (1894), No. 3078*.

SERIES XI.

DISEASES AND INJURIES OF THE PLEURA, BRONCHIAL TUBES, AND LUNGS.

ATELECTASIS.

- 1696b. The Lungs of a child who died from Whooping Cough; the lower free edges of all the lobes are collapsed and airless; this is especially noticeable on the right side; the upper and greater part of the specimen showed, when fresh, slight general emphysema.

See *Medical Post-Mortem Register*, vol xxi. p. 67.

SERIES XII.

DISEASES OF THE MOUTH, TONGUE, PALATE,
AND FAUCES.**DIFFUSE PAPILLOMA.**

1785a-2. A Tongue removed by operation. The whole of the right half is occupied by a large mass, with overhanging edges composed of greatly hypertrophied papillæ, many of which are definitely pedunculated. There is no ulceration, and the deeper structures of the tongue do not appear to be involved.

From a man aged 61, who was addicted to drink, and had always been a great smoker; for two years he had noticed a small lump near the middle of the tongue; it gave no pain, and did not increase until about eight months before the operation; the growth was constantly being irritated by the gutta-percha mouth-piece of his pipe, which stuck to it; for the last two months he had suffered pain radiating up the side of his head; it was tender on pressure, but did not cause pain on mastication; it was removed by scissors. There were no enlarged glands. Microscopically its structure is that of a papilloma.

Presented by R. H. Kinsey, Esq.

ADENOID VEGETATIONS.

1806b. A mass of Post-Nasal Adenoid Tissue, removed by operation from the back of the pharynx; microscopically its structure is almost identical with that of the tonsil.

POLYPUS OF TONSIL.

1807b. A Tonsil to which is attached a distinct Polypus measuring half an inch in length.

The whole was removed by operation for chronic enlargement from a patient aged 17.

Presented by Alexander G. R. Foulerton, Esq.

SERIES XIV.

DISEASES OF THE SALIVARY GLANDS.

1830b. One half of a Tumour removed from the Parotid Region, consisting almost entirely of Hyaline Cartilage: the central parts have undergone softening, and when incised contained a clear glairy fluid.

From a woman aged 43, who had noticed the swelling for ten years.
See *Female Surgical Register*, vol. ii. (1893), No. 557.

MYXOMA.

1831a. A Tumour removed by operation from the Parotid Gland: it has been incised, and it is seen that the interior consists of a soft homogeneous material: microscopical examination showed its structure to be that of a myxoma.

See *Male Surgical Register*, vol. v. (1892), No. 342.

1832b. One half of a Tumour of the Parotid Gland, removed by operation. The cut surface shows a number of cavities or cysts: when fresh, these contained a glairy fluid, probably due to the myxomatous or hyaloid degeneration of parts of the tumour: the outer surface is smooth and regular, and there is a well-marked capsule. Microscopical examination showed the tumour to be a tubular adenoma.

From a lady aged 35; there were no secondary enlargements or deposits. Microscopical sections are preserved in Series lv. No. 236.

Presented by Howard Marsh, Esq.

SERIES XVII.

DISEASES AND INJURIES OF THE STOMACH.

NON-MALIGNANT STRICTURE OF PYLORUS.

1907a. The Pylorus, Stomach, and Portion of the Œsophagus of an infant, showing very great hypertrophy of the muscular coat of the pylorus. The stomach is also thickened, while the œsophagus is dilated. The mucous membrane of the pylorus is congested and swollen. Microscopical examination showed nothing of the nature of any tumour, the thickening being simply an overgrowth of the unstriped muscular tissue. This ceases quite suddenly on the distal side of the pylorus, but gradually tapers off towards the cardiac end of the stomach.

From an infant aged 7 weeks, quite healthy at birth. When three weeks old vomiting began, which continued in spite of all treatment, including numerous changes of diet, until the child died of inanition. At the autopsy, no cause for death could be discovered beyond the hypertrophied pylorus. This measured two inches in diameter, and was quite hard to the touch.

Presented by J. Raglan Thomas, M.D.

1907b. A Shrunken and Contracted Stomach from a patient who suffered from Chronic Dyspepsia. It has been laid open by an incision carried along the anterior surface. The mucous membrane has a peculiar wasted appearance; there is some thickening of the muscular coats, especially at the pyloric end. At the pylorus itself is the recent scar of an operation wound, over which a portion of the great omentum was stitched as a graft. At this point the muscular coats are greatly hypertrophied. Microscopical examination showed this to be the cause of the thickening, and that there was complete absence of glandular structure; there were no signs of any malignant growth. The stomach, when fully distended, would only hold seven ounces of fluid.

The patient was a gentleman aged 50, who had suffered for about five years from chronic dyspepsia, aggravated and accompanied by vomiting and great wasting, especially during the last four or five months of his life, so that his weight, which had been 12 stones when he was in health, diminished to 6½ stones. Constriction of the pylorus was diagnosed, and laparotomy with division of the

pylorus was performed. He rallied somewhat after the operation, but died ten days later from inanition. At the autopsy it was found that the stitches had held, and there was no peritonitis. No malignant growth was found either in the stomach or any other viscus.

Presented by Thomas Smith, Esq.

DILATATION FOLLOWING A MALIGNANT STRICTURE.

1923a. A Stomach which has become enormously distended owing to a Malignant Stricture at the Pylorus. This has been cut through and a portion removed, together with part of the muscular wall, so as to expose the interior of the viscus. Except in the immediate neighbourhood of the stricture the muscular coats are not thickened. The measurements of the stomach are as follows:—The capacity is ten pints; the length along the lesser curvature is nine inches; along the greater curvature it is thirty-three and a half inches, and the circumference is eighteen inches. Microscopical examination showed the new growth to be a scirrhus carcinoma.

From a man aged 47, who had suffered from symptoms of pyloric obstruction for a year.

See *Male Surgical Register*, vol. iv. (1894), No. 226.

SERIES XVIII.

DISEASES AND INJURIES OF THE INTESTINES.

POLYPUS (LIPOMA) OF SMALL INTESTINE.

2019d. A portion of the Small Intestine, laid open to show a small oval polypus attached to the mucous membrane. The polypus has been incised, and is seen to be composed of fat. It has a well-marked capsule of fibrous tissue.

EXCISION OF CÆCUM.

2027d. A Cæcum removed by operation for the relief of obstruction caused by a Malignant Stricture. The mucous membrane covering the ileo-cæcal valve, as well as that over the whole circumference of the bowel for two inches above the valve, is thick and velvety in appearance, and superficially ulcerated, while the walls are greatly thickened, so that the lumen of the intestine is much diminished. The growth has extended into and has enlarged the first portion of the vermiform appendix, but there are no perforations nor any adhesions to neighbouring structures. A margin of healthy intestine remains at both ends of the diseased portion.

The patient was a married lady aged 50, who had suffered for six months from irregularity of the bowels, constipation alternating with diarrhoea. For four months she had noticed a tumour in the right inguinal region. At the operation, after removal of the growth, the ends of the divided bowel were sewn up, and the ileum and ascending colon were placed side by side and united by means

of Senn's decalcified bone plates. She recovered from the operation, and when seen four months later was in good health. The scar was firm and soft, and nothing abnormal could be felt in the abdomen.

Microscopical examination showed the structure of the tumour to be adenoid carcinoma. Sections are preserved in Series lv. No. 265b.

For full details of the case see *Lancet* (1894), vol. i. p. 538.

Presented by Herbert J. Ilott, M.D.

2027e. A Cæcum and portion of the Ascending Colon, removed by operation on account of a Fæcal Fistula, resulting from a former Perityphlitic Abscess. The specimen was removed in two pieces, which have been sewn together. The upper or distal part has been laid open, and a small glass rod props open the constricted part. On both sides of this the mucous membrane presents a curious polypoid condition. Some of the polypi, branched and clubbed at their free ends, measure over an inch in length.

From a youth aged 15 years, who for eighteen months had suffered from a fæcal fistula, through which all the contents of the bowel passed. The fistula had followed on an operation, at which a large perityphlitic abscess, believed to be tubercular in origin, had been opened. After the excision the severed ends of the colon were brought together by means of Senn's plates. He recovered from the operation and left the Hospital. A small fistula remained, and this was closed by a separate operation a few months subsequently.

Microscopical sections of the polypi are preserved in Series lv. No. 254c.

See *Male Surgical Register*, vol. iii. (1892), No. 166.

2027f. A portion of the Ascending Colon, together with the Cæcum and last two inches of Ileum, removed by operation on account of a Malignant Stricture. The piece of bowel removed measures over seven inches in length. It has been divided longitudinally to expose more fully the affected part. This forms an ulcerated outgrowth an inch in width, which has encroached upon and has greatly narrowed the lumen of the bowel. At this situation the coats of the intestine are infiltrated; on the proximal side of the stricture the walls of the colon and also of the ileum are very much thickened in comparison with the distal side. The longitudinal muscular bands are also hypertrophied and the intervening portions are thrown into deep folds.

The patient was a man aged 33, who first suffered from pain in the abdomen with constipation six months before his admission into the Hospital. At the operation the divided ends of the ileum and colon were brought together and united by Czerny-Lembert sutures. He recovered, and went to the Convalescent Home at Swanley. At the end of two months he was readmitted, and died subsequently, nine months after the operation.

See *Male Surgical Register*, vol. iii. (1893), No. 1688.

Microscopical sections of the strictured part are preserved in Series lv. No. 265d.

EXCISION OF CÆCUM AND ASCENDING COLON.

2027g. The specimen consists chiefly of the Ascending Colon, the seat of very advanced Carcinoma, which has undergone colloid degeneration. The new growth forms a large mass, involving the whole circumference of the bowel for a length of nearly six inches. In its centre is an irregular ulcerated cavity, which communicates by a narrow opening,

through which a red glass rod is placed, with the cæcum, to which the colon is firmly adherent. To the left of the specimen is the termination of the ileum, marked by a narrow blue glass rod; a small green rod is fixed to the commencement of the ascending colon, and a small white rod has been placed in the open end of the vermiform appendix.

The sequence of events appears to have been as follows:—The ascending colon having become affected with carcinoma, subsequently formed adhesions to the cæcum, situated some little way distant from it, and a fistula formed between the two; the whole mass thus firmly united was removed, the distal end of the ileum being united to the proximal end of the colon by means of Senn's plates. The operation was necessarily a prolonged one, and the patient only survived about thirty hours.

The patient was a man aged 35, who had been in failing health for eighteen months. He had known of a tumour in his abdomen for ten months, during which time it had not much increased in size. He had suffered from diarrhoea for the last four months.

Microscopical sections of the tumour are preserved in Series lv. No. 266a.

For a full history see *Male Surgical Register*, vol. iii. (1892), No. 1369.

MALIGNANT STRICTURE.

2029b. The Ascending Colon, Cæcum, and last two inches of the Ileum, laid open to show a Malignant Stricture at the hepatic flexure, and its consequences. The whole colon on the proximal side of the new growth is enormously distended, and its walls are hypertrophied. These changes are also well marked in the ileum; the mucous membrane generally is also thickened, and in a few places has given way, leading to the formation of ragged ulcers with overhanging edges; no perforation has occurred. The stricture itself is a narrow one, its ulcerated surface measuring rather less than one inch; microscopically, it was found to be a columnar-celled carcinoma undergoing colloid degeneration.

See *Medical Post-Mortem Register*, vol. xx. p. 182.

CATARRH OF VERMIFORM APPENDIX.

2034a. A Vermiform Appendix removed by operation on account of recurrent attacks of perityphlitis. It has been laid open to show the inflamed and œdematous condition of the mucous membrane.

See *Male Surgical Register*, vol. iv. (1893), No. 3526.

SERIES XX.

H E R N I A.

COMPOUND SAC.

2085a. The Sac of a Left Inguinal Hernia, removed in the course of an operation for radical cure. The larger sac, which has been laid open, is

suspended by the neck ; at a spot distant about one inch from the margin is a second smaller sac or pouch, in which a red glass rod has been placed.

From a man aged 33. The hernia was thought to have been acquired. He had worn a truss for three or four years, and had had one attack of strangulation. At the operation the larger sac was found to contain omentum only ; the smaller sac was empty.

Presented by C. B. Lockwood, Esq.

FORMATION OF SAC INTO A SAC.

2087a. The Sac of a Femoral Hernia, into which a second separate Sac has become invaginated. The specimen is suspended by the neck of the larger sac. Into the cavity of the smaller a green glass rod has been placed : its mouth, which apparently communicated with the peritoneal cavity, lies about one inch below the neck of the larger sac.

The specimen was removed in the course of an operation for the radical cure of the hernia.

See *Female Surgical Register*, vol. iii. (1894), No. 194.

OVARY IN HERNIAL SAC.

2113a. An Ovary and Fallopian Tube, together with the Sac, which were removed in the course of an operation for the radical cure of a femoral hernia. Both are adherent to the back of the sac ; the Fallopian tube is bent upon itself, and is adherent to the top of the ovary. A small black glass rod has been inserted into the ostium abdominale ; the peritoneal cavity was cut off from the sac.

From a young woman aged 20, who had worn a truss for thirteen years. She made a good recovery.

See *Female Surgical Register*, vol. v. (1893), No. 2023.

2113b. An Oval Cystic Tumour, measuring two inches in its long diameter, which was removed by operation from the sac of a femoral hernia. Although bearing some resemblance to an ovary, microscopical examination showed its walls to consist mainly of fibrous tissue which had become slightly inflamed. There were no traces of ovarian structure.

See *Female Surgical Register*, vol. iii. (1888), No. 211.

2113c. A Cystic Tumour very similar to the preceding specimen (No. 2113b), which was removed by operation from the sac of an inguinal hernia of a young woman. It has been laid open, and is seen to consist of two sacculi with thin walls. Microscopical examination showed thin bands of striped muscle fibres interspersed here and there in the cyst walls. There were no signs of any ovarian structure.

From a young woman aged 24, who had noticed the swelling in her right inguinal region for five years. She stated that it became larger and tender during her menstrual periods.

Microscopical sections are preserved in Series lv. No. 291.

See *Female Surgical Register*, vol. iii. (1892), No. 991.

STRANGULATED FUNICULAR HERNIA.

1240g. The Cæcum and adjacent portions of the small and large Intestines of a child, showing a loop of Ileum strangulated into the funicular portion of the tunica vaginalis. The sac of the hernia, formed by the unobliterated portion of the tunica vaginalis, has been laid open. The testis lies in a well-formed sac of its own, quite distinct from that of the hernia. The strangulated portion of intestine is still of a rather dusky hue, and is partially covered by a layer of coagulated lymph. When fresh it was of a dark purple colour, as is usual in these cases.

From a child aged 6 months.

See *Surgical Post-Mortem Register* for 1892, p. 32.

SERIES XXI.**DISEASES AND INJURIES OF THE LIVER.****SARCOMA.**

2215b. A portion of the Right Lobe of the Liver of a child aged three years. The cut surface shows that hardly any traces of liver tissue remain, the whole organ being infiltrated with a soft disintegrating new growth, in which cavities of various sizes have formed. On the outside, the natural shape of the liver has undergone great alteration. It is now irregularly lobulated in all directions from the presence of numerous more or less globular deposits, which vary in size from about one to two inches in diameter. The whole liver weighed four pounds and one ounce when recently removed. Microscopically its structure is that of a small round-celled sarcoma.

The child was jaundiced, but only during the fortnight before its death. The other viscera did not contain any secondary deposits.

Presented by S. C. H. Moberly, Esq.

SERIES XXII.**DISEASES AND INJURIES OF THE GALL-BLADDER
AND BILIARY DUCTS.****RETAINED BILE.**

2264c. A portion of the Fluid removed by operation a few days before death from a Gall-Bladder, which was greatly distended owing to a malignant stricture of the common bile duct. It is of a dark brown, almost black colour, and when first removed was of a thick tarry consistency. The whole quantity measured five ounces.

See *Medical Post-Mortem Register*, vol. xix, p. 239.

SERIES XXV.

DISEASES AND INJURIES OF THE SPLEEN.

INFARCT.

2295d. A Spleen which has been partially cut through longitudinally to show more fully the results of numerous Infarcts. The parts most affected are the upper and lower ends, at each of which there is a large partly decolorised clot, which has begun to disintegrate. The peritoneal surface shows several small depressions caused by former infarcts.

From a man aged 38, who died from cerebral hæmorrhage. The heart was enlarged, and the mitral orifice was surrounded by numerous vegetations. The kidneys also showed many depressed scars, caused by infarcts.

See *Medical Post-Mortem Register*, vol. xx. p. 127.

SERIES XXVIII.

DISEASES AND INJURIES OF THE KIDNEYS, THEIR
PELVES, AND THE URETERS.

CARCINOMA.

2392d. One half of a Kidney extensively infiltrated by a new growth. At the upper part of the specimen the normal tissue of the kidney has entirely disappeared, its place being occupied by a nearly spherical mass over five inches in diameter; its cut surface is ragged and uneven. At the edge, projecting towards the hilum, are a series of spaces or cysts occupied by a soft homogeneous growth. The outer surface of the kidney presents an uneven and nodular appearance from the presence of numerous masses which have for the most part coalesced; these are darker in colour than the healthy kidney tissue. Microscopical examination showed the structure to consist of a number of branching processes covered by short columnar cells. The whole tumour when removed weighed two pounds.

From a young gentleman aged 19, who first noticed a swelling in his right loin in November 1892. This gave him no pain, but increased rather rapidly; there was no alteration in the quantity or quality of the urine. The kidney was removed early in May 1893, the operation lasting two and a half hours. He made a good recovery, and was able to hunt all through the following winter. A year later he was in good health.

Microscopical sections are preserved in Series Iv. No. 389a.

Presented by Thomas Smith, Esq.

SERIES XXIX.

DISEASES AND INJURIES OF THE URINARY
BLADDER.

RUPTURE OF BLADDER.

2440d. A Bladder showing near the fundus the line of a large rupture, mainly intraperitoneal: the wound was closed during life by a number of fine silk ligatures: at the post-mortem examination the bladder held water well.

From a woman aged 34, who, while under the influence of drink, received a kick in the abdomen: three days later she consulted a doctor, stating that she had only passed a teacupful of urine since the injury: a catheter was introduced and two ounces of blood-stained urine were drawn off: shortly afterwards she was admitted to the Hospital, when abdominal section was performed, and the rupture closed: she died twenty-four hours later: at the autopsy, slight but general peritonitis was found, but no stitches had given way.

See *Female Surgical Register*, vol. iv. (1892) No. 1396.

SERIES XXX.

DISEASES AND INJURIES OF THE BRAIN AND
ITS MEMBRANES.

SARCOMA.

2465c. The Tentorium Cerebelli and posterior portion of the Falx Cerebri: springing from the upper surface of the right half of the tentorium is a more or less globular tumour, with an irregular and lobulated surface, measuring nearly three inches in its longest diameter: the falx is pushed towards the left: the cut surface shows several small cysts, varying in size up to that of a large pea, situated at the upper and back part of the tumour: the remainder is homogeneous in character. Microscopically the tumour consists of a small spindle-celled sarcoma with myxomatous patches leading to the formation of cysts.

From a woman aged 38, who had suffered from the symptoms of cerebral tumour for one month before her admission into the Hospital: she gradually became comatose, and died one week later. At the autopsy it was found that the tumour had by pressure hollowed out the under surface of the right occipital and temporo-sphenoidal lobes under which it lay: there was some superficial softening: the descending cornu of the right lateral ventricle was separated from the hollowed-out surface in which the tumour lay only by a thin layer of tissue, but it was not opened.

See *Faith Ward Book* for 1892, No. 179; and *Medical Post-Mortem Register*, vol. xix. p. 182.

CEREBRAL ABSCESS.

2486e. The Right Hemisphere of a Brain in which an Abscess has formed in the temporo-sphenoidal lobe as the result of suppuration in the middle ear (see specimen No. 2676b): the outer wall of the abscess cavity has been cut away in order to expose more fully the cavity itself. About one inch behind the abscess is a ragged wound in the cerebral substance caused by a trephining operation, which was performed ineffectually two days before death for the relief of symptoms.

From a man aged 29 years, who had suffered from purulent discharge from both ears for many years. An abscess in the brain was diagnosed, and the skull trephined with a view to evacuate the pus: after exposing the brain, a director was passed through the ragged wound in the direction of the abscess: no pus escaped: two days later the man died: at the *post-mortem* examination it was found that the director had passed into the abscess, but that the brain substance, by closing round the instrument, had prevented the detection of the pus. The temporal bone is preserved in the next Specimen (No. 2676b).

See *Male Surgical Register*, vol. iv. (1892), No. 2918; and *Surgical Post-Mortem Register* for 1892, p. 146.

ABSCESS IN CEREBELLUM FOLLOWING OTITIS MEDIA.

2486f. A Cerebellum in which there has formed a large Abscess on the lateral margin of the left semilunar lobe, consequent on suppuration in the middle ear: the abscess cavity has been evacuated and hardened in its distended condition.

From a man aged 26, who had suffered from discharge from the ear as long as he could remember. The temporal bone is preserved in Series xxxiv. No. 2676c.

See *Male Surgical Register*, vol. ii. (1892), No. 2951; and *Surgical Post-Mortem Register* for 1892, p. 141.

HYDROCEPHALUS.

2516a. The Brain and Cerebellum from a very advanced case of internal Hydrocephalus. The two hemispheres are both enormously enlarged by the great distension of the lateral ventricles, and are approximately symmetrical in shape: the longest diameter, taken antero-posteriorly, measures nine inches, while the transverse diameter of the two hemispheres combined is somewhat less: an aperture has been cut in the upper part of the right hemisphere to show the extent to which the cerebral substance has been absorbed: on the vertex the sulci between the convolutions have disappeared, while they can be only faintly traced in the lateral aspect: at the base of the brain they are still well marked, and the cerebellum has undergone but little or no change. It will thus be noticed that the effects of the pressure are much more marked on the vertex where the cerebral substance has undergone such great absorption: at the edges of the opening it is seen that there the walls of the sac, to which the brain has been reduced, are double: the outer of these consists of the remains of the cerebral substance, together with adherent pia mater, while the inner represents the thickened lining membrane of the lateral ventricles: the two layers are easily separable.

From a child aged 7 months: a drawing made shortly before its death is preserved in Series lvii. No. 654, and a cast of the head taken after death is preserved in Series lvi. No. 142b.

See *Medical Post-Mortem Register*, vol. xix. p. 330.

2516b. The right side of the upper part of a Cranium and Pericranium, with the lateral hemisphere and cerebellum *in situ*, from a case of a Symmetrical Internal Hydrocephalus and Meningocele. The pericranium forming the main covering of the meningocele has been opened and its edges turned back. The contour of the sac is irregularly bilobed, that portion which lies outside the cranial cavity being partially divided by an imperfect fibrous septum. Fibrous bands also stretch across the larger and posterior portion of the sac. The anterior portion communicates freely by a wide orifice with the anterior horn of the lateral ventricle. The lateral and posterior horns of the ventricle are also considerably dilated.

From a child aged 14 months. A swelling over the right parietal region, which rapidly increased, was noticed soon after birth. When admitted into the Hospital at the age of 12 months, there was some stiffness of the left arm, with slight contraction of the flexor muscles. With this exception there was no paralysis, and the child was bright and intelligent for its age. One month before death the swelling was aspirated, and about ten ounces of clear straw-coloured fluid withdrawn (see following Specimen, No. 2516c), but without any benefit.

See *Faith Ward Book* for 1893, sub Frederick Thompson.

A cast of the child's head, taken some few weeks before death, is preserved in the Teratological Collection, Series xxxvii. No. 63a.

2516c. Some of the opalescent Fluid, of a pale straw colour, which was drawn off by means of an aspirator one month before death from the patient from whom the preceding specimen (No. 2516b) was subsequently obtained.

2516d. A Brain in a condition of marked internal Hydrocephalus, associated with a tubercular enlargement of the pineal gland. The corpus callosum, which was very much thinned, has been divided; the anterior pillars of the fornix and the two lateral hemispheres have been widely separated, so as to expose fully the interior of the lateral ventricles. It is at once seen that both these cavities are very much dilated.

The pineal gland is enlarged so as to form a solid rounded tumour, measuring nearly an inch in its longest diameter. It has been divided longitudinally. Microscopical examination showed that the enlargement was due to chronic tubercular inflammation, with numerous typical giant cells.

From a child aged 6.

A microscopical section of the pineal gland is preserved in Series lv. No. 4316.

See *Medical Post-Mortem Register*, vol. xix. p. 184.

SERIES XXXI.

DISEASES AND INJURIES OF THE SPINAL CORD AND ITS MEMBRANES.

LACERATION OF CORD.

2547a. A portion of the Spinal Cord from the cervical region after a fracture of the cervical vertebræ. The dura mater has been laid open from behind,

and discloses the fact that for about one and a half inches the cord is completely disintegrated; there has also been considerable hæmorrhage into its tissues.

From a man aged 48, who received a severe injury to his neck, followed at once by complete paralysis of all muscles of the trunk and lower limbs. On admission to the Hospital, he was conscious and could move his arms. The cervical region of his spine was exposed, and the laminæ and some pieces of loose bone at the seat of injury were removed, but without any beneficial result; the dura mater of the cord was not torn, and did not appear to be bruised; it was not opened. He died ten hours after the operation.

At the post-mortem examination it was found that the bodies of the fifth and sixth cervical vertebræ had been fractured. No other injuries were discovered.

See *Male Surgical Register*, vol. i. (1892), No. 2813.

SERIES XXXII.

DISEASES AND INJURIES OF NERVES.

MULTIPLE MYXO-SARCOMATA OF MEDIAN NERVE.

2556a. A series of seventeen small Tumours removed by operation from the Left Median Nerve; they are irregular in shape, mostly oblong, with constrictions, here and there giving them a lobulated appearance; portions of nerve are in some cases attached at one end. When freshly removed they had the look and consistency of fat; under the microscope their structure was found to be that of a myxo-sarcoma.

From a woman aged 43. One of the largest had been noticed at the bend of the elbow for six months; at the time of the operation it was found that the tumours extended in a long chain as far down as the wrist.

See *Female Surgical Register*, vol. ii. (1893), No. 567.

INJURY TO ULNAR NERVE.

2567a. A Left Fore-Arm and Hand in which there has been an injury to the Ulnar Nerve. The skin has been removed and the parts dissected. Just below the internal condyle of the humerus, at a spot marked by a red glass rod, the ulnar nerve is constricted, but not divided. It is probable that the nerve was only partially divided, as the inner half of the flexor profundus digitorum is not wasted. Its nerve from the main trunk enters it at the usual place. Most if not all the other muscles supplied by the ulnar nerve, particularly the flexor carpi ulnaris, which now consists of fibrous tissue only, are much wasted. The inner head of the flexor brevis pollicis is thin and much paler than the outer head; the adductor pollicis, interossei, and muscles of the little finger are all much diminished in size; the two outer lumbricales, obtaining their nerve-supply from the median, are of normal size. The two inner have entirely disappeared. None of the fingers can be fully extended.

From a subject brought to the Hospital for dissection.

SERIES XXXIII.

DISEASES AND INJURIES OF THE EYE.

CALCAREOUS DEGENERATION OF CHOROID.

- 2613d.** An Eye which shows well the results of chronic inflammation. The sclerotic has been incised and a flap turned back. The choroid is rough and studded with small hard particles, the result of calcareous degeneration. The retina had been detached many years previously, and is now shrunk and fixed in front to the posterior surface of the lens, and behind by a narrow stalk to the optic disc. The cornea, though opaque, still shows the condition known as linear keratitis.

From a woman aged 17. The eye had been blind from birth.

See *Ophthalmic Ward Book* (1893), No. 1620.

MULTIPLE CYSTIC TUMOURS OF RETINA.

- 2667a.** An Eye removed by operation and divided equatorially. Attached to the posterior surface of the lens is a delicate new formation of fibrous tissue, extending outwards over the ciliary processes as far as the ora serrata.

The retina is detached in the whole of the upper part, in front as far as the ora serrata, behind as far as the disc. At the outer side are three small rounded white masses lying close together; two of these lie wholly in the retina, the third is adherent to the choroid. They appear to be thin-walled cysts containing a white substance, and are similar to bodies found in detached and degenerating retinae.

From a man aged 36.

See *Albert-Edward Ward Book* for 1894, sub John Backland.

A drawing of the appearance when fresh is preserved in Series lvii. No. 755.

SERIES XXXIV.

DISEASES OF THE EAR.

OTITIS MEDIA.

- 2676b.** The Right Temporal Bone from a case of cerebral abscess. (See specimen No. 2486e.) A perpendicular section has been made through the auditory meatus exposing the tympanic cavity. Suppuration had occurred here, and although the posterior mastoid cells had been opened by an operation immediately behind the meatus, the inflammation spread to the roof of the tympanum, thence to the dura mater, which is thickened and perforated, and finally to the brain itself. The lateral sinus is not affected.

For a history of the case see Series xxxiv. No. 2486e.

- 2676c.** A portion of the Left Temporal Bone, which has been sawn so as to expose the cavity of the tympanum where suppuration has occurred. The posterior mastoid cells were the most affected; from these the inflammation has spread through the bone into the posterior fossa of the skull below the lateral sinus. At this point the dura mater became involved. In it is a rugged opening which communicated with an abscess in the semilunar lobe of the cerebellum. (See Series xxxiv., specimen No. 2486f.)

SERIES XXXV.

DISEASES AND INJURIES OF THE SKIN.

- 2732b.** The distal phalanx of a Great Toe removed by amputation owing to the pain and inconvenience caused by an ingrowing toe-nail.

See *Female Surgical Register*, vol. ii. (1893), No. 1443.

SERIES XXXVI.

DISEASES OF THE TESTICLE.

CHRONIC ORCHITIS.

- 2762c.** A Right Testis, removed by operation on account of chronic inflammation. It has been laid open, and it is seen that all the surrounding structures, as well as such of the tissues of the testis as remain, are much altered and thickened. The tunica vaginalis is a cavity with thick fibrous walls, and the tunica albuginea shows a very considerable deposit of fibrous tissue. The vas deferens, which has been separated from the upper part of the tunica vaginalis, is also greatly thickened. In the centre is an irregular cavity, which contained pus, formed by the "breaking down" of the substance of the testis. At the lowest part of the specimen is the depressed scar of a former abscess. Microscopical examination failed to show the presence of tubercle, though it is possible that the inflammation was of that nature.

From a man aged 32, who stated that his right testis had been gradually increasing in size for about six months.

See *Male Surgical Register*, vol. iv. (1893), No. 400.

SYPHILIS.

- 2771a.** One half of a Testis and its Tunica Vaginalis, which have been injected with carmine, hardened, and subsequently laid open longitudinally. The tunica albuginea is greatly thickened, and the testis is slightly enlarged; its body is occupied by white irregular masses, which

entirely replace the normal tissues ; the injection has not penetrated into the gummatous masses, leaving them unstained and white. The tunica vaginalis is much distended, giving rise to a large hydrocele.

The specimen was removed by Sir George M. Humphry, F.R.S., from a man aged 54, who had had syphilis for many years. At the time of the operation he was suffering from periosteal pains in various parts.

Received in exchange from the University of Cambridge.

TUBERCULOSIS.

- 2774d. One half of a Testis removed by operation on account of tubercular disease. The specimen has been cut through longitudinally, and it is seen that the epididymis and vas deferens are the parts mostly affected. The epididymis is much enlarged, and its upper end is tilted forwards and has become adherent to the tunica vaginalis. Here and there the tubercular deposit in the epididymis and vas deferens has resulted in the formation of small abscess cavities ; it is beginning to extend also into the body of the testis. The tunica vaginalis is distended, and there was some hydrocele as a result of the chronic inflammation.

See *Male Surgical Register*, vol. iv. (1893), No. 1300.

SERIES XXXVII.

DISEASES OF THE SCROTUM.

“CHIMNEY-SWEEP’S” CANCER.

- 2823b. A very large Epithelioma of the Scrotum, removed by operation. The growth forms an oval fungating mass, measuring four inches in its long diameter.

From a man aged 57, a wheelwright by occupation. The tumour was of only three months’ duration.

See *Male Surgical Register*, vol. v. (1892), 1965.

SERIES XL.

DISEASES AND INJURIES OF THE URETHRA AND PENIS.

SEBACEOUS HORN.

- 2388a. A Sebaceous Horn removed by operation from the side of the corona of the glans penis.

From a man aged 48, who had been circumcised seven months previously. The horn began to grow shortly afterwards.

A drawing and a photograph are preserved in Series lvii. Nos. 959a and b.

See *Male Surgical Register*, vol. iii. (1894), No. 169.

- 2902a. A Cast Iron Ring, weighing six ounces, with an internal diameter of one inch, into which a man inserted his penis. Owing to rapid swelling of the parts, the ring could not be withdrawn, and it became necessary to file it through in two places. This took four hours to accomplish.

SERIES XLI.

DISEASES OF THE OVARIES.

PAPILLOMATOUS CYST.

- 2913a. An Ovarian Cyst measuring four and a half inches in diameter, which was removed by operation. It has been opened and the fluid contents removed: a partial septum stretches across its posterior wall, the surface of which is studded by numerous small rounded papillomatous growths. The Fallopian tube is stretched over the upper and back part of the cyst: near the ostium abdominale the tube has been dilated and forms a small independent cyst. The tumour was removed from the right side.

From a woman aged 35, who first noticed a painful swelling in the left iliac region five years before her admission into the Hospital: two years later she noticed a swelling on the right side: she made a good recovery from the operation.

See *St. Bartholomew's Hospital Reports*, vol. xxix. p. 25, Case V.

See also next Specimen, No. 2913b.

- 2913b. An Ovary affected by Compound Papillomatous Disease, which was removed by operation from the same patient as the preceding specimen (No. 2913a). It is considerably enlarged, and measures three inches in its longest diameter: the whole surface is studded with numerous compound papillomatous growths, so that none of the normal structure can be seen: the Fallopian tube, from which the specimen is suspended, is also enlarged, especially towards the uterus: its cut extremity shows that its interior is dilated and studded with similar compound papillomata.

THE REMOTE EFFECTS OF OVARIOTOMY.

- 2932a. Two Silk Ligatures removed from a sinus in the abdominal wall of a patient upon whom ovariectomy had been performed some months previously.

The operation was performed in August 1892: the patient returned to the Hospital ten months afterwards with a small sinus at one end of the scar. This was gradually dilated by bougies up to the size of a No. 12 catheter (English), and on forcibly syringing water into it, the two knotted ligatures were evacuated.

See *Female Surgical Register*, vol. ii. (1893), No. 1122.

SERIES XLII.

DISEASES OF THE UTERINE APPENDAGES.

PARAMETRITIS.

- 2939a. The left half of an Uterus with the Fallopian Tube and Ovary of the same side. There is a rounded swelling in the broad ligament which involves the edge of the uterus: this has been laid open on its posterior surface, and is seen to consist of a number of small abscesses and sloughing cellular tissue.

See *Medical Post-Mortem Register*, vol. xix. p. 81.

SERIES XLIII.

DISEASES OF THE UTERUS.

HÆMATOMETRA.

- 2965b. The Uterus of a woman aged sixty: the cavity, which has been laid open by a longitudinal incision carried down through the cervix into the vagina, is considerably dilated: its walls are still discoloured: when opened it contained about an ounce of dark broken-down blood-clot.

From a woman who died from gangrene of the leg.

See *Female Surgical Register*, vol. i. (1890), No. 902a.

EXTIRPATION OF PREGNANT UTERUS.

- 3006d. An Uterus removed by operation through the vagina on account of well-marked Carcinoma of the Cervix: the external os is patulous and hypertrophied, especially the posterior half: there is also some ulceration of the surface. The whole uterus is much enlarged: it has been laid open by a longitudinal incision, and shows the changes due to pregnancy towards the end of the first month. The ovum is in the right half of the uterus (to the left of the spectator); the left ovary contains a corpus luteum.

For a history of the case see *Martha Ward Book* for Nov. 11, 1892.

The patient recovered from the operation.

SERIES XLV.

DISEASES OF THE OVUM AND ITS MEMBRANES.

MYXOMA FIBROSUM OF THE CHORION.

- 3043b. One half of a pear-shaped mass measuring two and a half inches in its long diameter, which was discharged from the uterus. The cut surface shows a more or less stratified appearance, due to the hypertrophy of the chorionic stems.

3058e. A Decidual Cast of the Uterus such as occurs in extra-uterine gestation. There is no evidence of there having been an intra-uterine ovum. Microscopical examination showed the tissue to be composed of typical pregnancy-decidual cells, and vessels.

From a young nulliparous married woman aged 25, who had not menstruated for three months. The probability of there being an extra-uterine gestation seemed so great that an exploratory operation was performed, but both ovaries and oviducts were found to be quite normal.

See *Martha Ward Book*, July 30, 1893.

See also *Obstetrical Society's Transactions*, 1894.

HYDRAMNIOS.

3059a. A Fœtus with its membranes, which was expelled from the uterus as an abortion. The whole mass is about the size of an ovum at the end of the fourth month, while the fœtus, which is seen in the amniotic cavity, is no larger than one at the end of the fourth week.

From a young married woman who considered herself to be in the third month of pregnancy at the time she aborted.

TWIN ABORTION.

3061a. A Twin Abortion, consisting of two amniotic sacs, still partially united by the chorion. Each sac has been laid open, and is seen to contain an embryo of about four weeks. The umbilical cord is as yet untwisted. The placenta is in the course of formation, and its limits can be fairly well made out.

From a case of "missed abortion" with the following history:—The patient had missed two menstrual periods. When the third period was due, there was some loss of blood, with occasional slight pain. This ceased after two days. There was a recurrence of the bleeding about three weeks later, which lasted for a week, and then ceased. After an interval of a fortnight, the loss of blood again occurred, with pains, and this was followed by the extrusion of the specimen.

Presented by Alexander G. R. Foulerton, Esq.

SERIES XLVII.

DISEASES AND INJURIES INCIDENTAL TO GESTATION AND PARTURITION.

SECONDARY FŒTUS.

3067a. A Newly-Hatched Canary, dried and shrivelled.

The specimen was one of a brood of four, and was found a few days after hatching flattened against the side of the nest. It is preserved to show the analogy between it and a so-called "secondary fœtus," one of a plural brood in each case being killed by the pressure of others, and flattened against the "nidus."

Presented by F. H. Champneys, M.D.

SERIES XLVII.

DISEASES OF THE PELVIS.

3104d. The Pelvis and two lower Lumbar Vertebrae of a youth who suffered from Extroversion of the Bladder. The specimen shows the same characteristics as the preceding (No. 3104c), but to a less extent, in addition to which the union of the component parts of the pelvis is somewhat delayed.

The sacrum is composed of five vertebrae, the upper border of the first forming a well-marked promontory. The lower sacral vertebrae are already united to each other; but the upper, due to the fact that there is increased mobility in this region in these cases, are still separate. The coccyx is well developed, but is not ankylosed to the sacrum. The lateral masses of the first vertebra are everted, so that they lie in a plane slightly behind the front surface of the body.

The separation between the pubic bones measures one and a half inches. On both sides the iliac fossa is very deep, the right being a little deeper than the left. The anterior superior spines are nearly, but not quite, as wide apart as the top of the iliac crests.

From behind marked departures from the normal are present. The laminae of the first sacral vertebra have failed to unite in the middle line, and the point where they come nearest together to form a spine lies in a deep groove between the posterior parts of the crests.

From a youth aged 13, on whom several operations had been performed with a view to close in the bladder.

See *Surgical Post-Mortem Register* for 1891, p. 69.

SERIES XLVIII.

DISEASES OF THE MAMMARY GLAND.

TUBERCULAR ABSCESS.

3144a. One half of a Mammary Gland removed by operation on account of a large cystic swelling situated in the deepest part of the breast; it was found to contain pus; its walls are ragged and uneven, and are covered with a fine velvety deposit.

From a woman aged 60. Some of the axillary glands were enlarged, and were removed at the same time. These were examined and found to contain tubercle bacilli; though looked for, no bacilli could be seen in the pus from the abscess cavity.

See *Female Surgical Register*, vol. i. (1893), No. 257.

DUCT CARCINOMA.

3186f. One half of a Breast which has been divided longitudinally through the nipple. A tumour with well-defined edges occupies the

greater part of the specimen; it is more or less cystic in character, the cysts being occupied by a finely granular material of a dark-brown colour from the effusion of blood. The nipple is retracted, but only to a slight extent; the skin is not involved. Microscopical examination showed the structure to be that of a duct carcinoma.

See *Female Surgical Register*, vol. v. (1892), No. 1932.

SERIES L.

GENERAL PATHOLOGY.

PERFORATING ULCER.

3233c. The anterior portion of a Right Foot. On the plantar surface are the depressed scars of two former perforating ulcers situated over the heads of the metatarsal bones of the great and little toes; both of these toes are very much shortened owing to the destruction of the greater part of the phalanges; this is most marked on the dorsal aspect.

From a man aged 43, who suffered from tabes dorsalis, and who died in the Hospital; at twenty years of age he contracted syphilis.

The left ankle showed the changes due to Charcot's disease of joints; the macerated bones are preserved in Series ii. No. 691e.

A cast of the foot is preserved in Series lvi. No. 178b.

See *Male Surgical Register*, vol. iv. (1893), No. 71.

VARICELLA.

3233k. A portion of Skin from the groin of a child who died during a severe attack of varicella: there are four deep ulcers of varying size, with sharp clean-cut edges: the ulceration has spread through all the layers of the skin, but has not extended to the deeper structures.

See *Surgical Post-Mortem Register* for 1893, p. 140.

GANGRENE.

3235h. A Left Foot removed by amputation through the lower third of the leg for moist gangrene following a compound fracture. Both tibia and fibula were broken: the seat of fracture in the latter can be seen just above the incision through the soft parts: there is a well-defined line of demarcation, with a sloughing ulcerated surface, exposing some of the tendons: the skin below this is dark and discoloured, and the epidermis over the toes and sole is loose and partially detached. The anterior tibial artery has been laid open, but does not contain any clot.

From a man aged 18, who broke his leg at sea nearly four weeks before the amputation; he made a good recovery.

See *Male Surgical Register*, vol. iii. (1891), No. 1366.

3235j. The Right Hand and part of the Bones of the Forearm in a condition of dry gangrene. The skin and soft parts of the hand and of the distal three inches of the forearm are in a dried and mummified condition, and quite black. The line of demarcation where the bones become visible formed slowly but spontaneously, and at the time when

the dead parts were removed by operation, it was only necessary to strip the soft parts back far enough to form a covering for the divided bones.

From a woman aged 32, who first noticed pain in and discoloration of the skin of her hand six days before admission into the Hospital. A drawing of the hand and forearm as it then appeared is preserved in Series lvii. No. 1094. The hand was removed three months after the first onset of symptoms.

See *Female Surgical Register*, vol. ii. (1893), No. 7.

FAT NECROSIS.

- 3238k.** A piece of the Great Omentum and of the Large Intestine. On the peritoneal surface of the latter, and scattered here and there on the former, are numerous small areas where the fat has assumed a dead white or opaque appearance, due to local changes in its nutrition, and giving rise to the condition known as "Fat Necrosis." These appearances were present when the specimens were fresh, and before their removal from the body.

Presented by H. D. Rolleston, M.D.

LEPROSY.

- 3239p.** The Left Hand, Forearm, and Elbow removed after death from a man who suffered from Leprosy (*Lepra Mutilans*). The whole limb is shrunk, withered, and much shortened. The shortening is due to the fact that in the course of the disease all the carpal bones, with portions of the distal ends of the radius and ulna, have disappeared; so that the hand is now united to the forearm by skin and fibrous tissue only. A small sinus exists on the outer side of the wrist over the lower end of the ulna. There is also a typical leprosy ulcer over the elbow-joint.

From a man about 40, who died in the Leper Hospital at Nicosia, Cyprus.

A photograph of him, together with other patients affected with the same disease, is preserved in Series lv. No. 1114a (No. 1).

Dr. Guy Stephen, in charge of the Leper Hospital, writes: "What usually happens is as follows:—After a long slow wasting of a hand or foot, a phalanx gets swollen, an ulcer forms over the joint, and the bone, half absorbed, drops out; the ulcer heals and the fleshy parts contract, and the process is repeated elsewhere. If, however, the process is more rapid, several joints may be attacked at once, especially in the lower extremity, and the whole foot sloughs away, with, however, very little constitutional disturbance."

Presented by Guy Stephen, Esq.

MELANOTIC SARCOMA.

- 3314a.** A portion of Skin removed from the chest-wall, below which is hung one-half of an axillary gland; both are affected by Melanotic Sarcoma. The primary growth consists of a number of small rounded nodules, which project slightly above the surface; the pigment does not extend into the deeper layers of the skin. The secondary affection of the lymphatic gland has resulted in a general enlargement, with a deposit of pigment in the central layers.

From a gentleman aged 33.

Microscopical sections of the lymphatic gland are preserved in Series lv. No. 336a.

Presented by H. T. Dutlin, Esq.

LYMPHANGIOMA (LUPUS LYMPHATICUS).

3386b. The specimen consists of a portion of Skin and an ill-defined Tumour lying beneath it. On the surface of the skin are a number of small vesicles, of which there is a cluster near one margin; when fresh these vesicles contained a clear fluid. At the edge of the cut surface are seen a number of small spaces filled by a clear homogeneous substance, the surrounding tissue having a spongy appearance caused by the dilatation of lymph spaces; at the back of the specimen is a large cyst filled with recent blood-clot, tumours of this nature being very liable to the occurrence of hæmorrhage into the dilated lymph spaces.

The tumour was removed by operation from the anterior fold of the right axilla of a gentleman aged 25; it was of congenital origin.

A microscopical section is preserved in Series lv. No. 777a.

Presented by Alfred Willett, Esq.

ACTINOMYCOSIS.

3382e. The left half of the Tongue of a heifer extensively affected by *Actinomyces Bovis*. The tongue has been hardened in Müller's fluid, and cut through longitudinally; the posterior half is much swollen, and on the cut surface it is seen that the muscular fibres are separated from each other by masses of the fungus; on the mucous surface there are several patches of ulceration, especially along the left border.

The heifer was bred near Trowbridge, in Wiltshire.

A microscopical section is preserved in Series lv. No. 825a.

Presented by George C. Tayler, M.D.

FOREIGN BODY REMOVED FROM RECTUM.

3391h. A White Glazed Porcelain Jar, measuring three and a half inches in length and nearly two inches in diameter, which was removed by operation from the rectum. The jar is similar to those used for the preservation of Liebig's extract of beef.

The patient was a man aged 35, who placed a small potato in the orifice of the jar, and then sat on it, to allay, as he said, intense itching at the anus. The jar slipped into the rectum; he came to the Hospital, and attempts were made with midwifery and other forceps for over two hours under an anæsthetic to remove the jar, but unsuccessfully. The next day he was again placed under an anæsthetic, and the sphincter ani was divided back to, and on either side of, the coccyx; it was not, however, until the abdomen had been opened, and the jar (with the potato still impacted) had been pressed down from within by the hand of an assistant that it could be extracted. So much injury had occurred to the rectum and the surrounding tissues that peritonitis set in and proved fatal.

See *Male Surgical Register*, vol. ii. (1893), No. 1715.

SERIES LII.

URINARY CALCULI.

145a. One half of a large Calculus removed from the bladder by suprapubic cystotomy. The nucleus, which measures over one inch in its

long diameter, consists of calcium oxalate, and the uniformly white outer layer of mixed (fusible) phosphates. The whole calculus weighed five and a quarter ounces.

From a man aged 65, who had had symptoms of stone in the bladder for four years; he lived in North Queensland.

Presented by Ernest Humphry, Esq.

RENAL CALCULUS PASSED PER URETHRAM.

234b. A Renal Calculus, measuring nearly an inch in its long diameter, and weighing 28 grains, which was passed per urethram; it is of about the size and shape of a small almond.

The patient was a gentleman aged 36, who gave a clear history of pain in the left lumbar region radiating down the groin during the passage of the calculus through the ureter; this was accompanied by a good deal of pain, but by no hæmorrhage. There was slight hæmorrhage, but not much pain during the passage through the urethra, which occupied about a day. The patient stated he had previously passed three calculi from the kidney, one of which was larger, the others smaller, than this specimen.

Presented by Alfred Willett, Esq.

SERIES LIII.

CALCULI AND OTHER CONCRETIONS FORMED IN THE DIGESTIVE ORGANS.

CHOLECYSTOTOMY.

274d. Sixty-two Gall-Stones removed by operation from a distended and suppurating gall-bladder. They are all more or less faceted; the largest gall-stone had undergone spontaneous fracture before removal.

From a widow aged 40, who had suffered from jaundice and pain in the right hypochondrium for one week. She made a good recovery from the operation.

For details of the case see *St. Bartholomew's Hospital Reports*, vol. xxviii. p. 51.

Presented by James Berry, Esq.

SERIES LIV.

CONCRETIONS FROM THE CIRCULATORY AND OTHER ORGANS.

GOUT.

304. A "Chalk Stone" removed from a gouty swelling on the back of a man's hand. It weighed 331 grains; it is composed mainly of urate of sodium, but has a trace of calcium and magnesium.

SERIES LV.

PATHOLOGICAL MICROSCOPIC SPECIMENS.

MYXO-SARCOMA OF HUMERUS.

- 37b. Section of a Sarcoma of the Humerus. It consists mostly of myxomatous tissue, intermixed with which are a few cartilage cells.

The Specimen from which the sections were taken is preserved in Series i. No. 446e, to which refer.

- 59a. Section of an Ossifying Chondro-Sarcoma of the lower end of the Femur: the specimen has been decalcified.

One half of the tumour is preserved in Series i. No. 431a.

- 59b. Section of a Cartilaginous Nodule from the same specimen as the preceding section (No. 59a); at this point there are no signs of ossification, the section consisting only of hyaline cartilage.

OSTEO-SARCOMA.

- 60a. A Section of a portion of a very large Osteo-Sarcoma of the Humerus: it consists of spindle-shaped sarcoma cells, into which trabeculae of bony tissue branch in all directions.

The specimen from which the sections were made is preserved in Series i. No. 474a, to which refer.

PAPILLOMA OF TONGUE.

- 200a. Section of a portion of a Diffuse Papilloma of the Tongue. It consists of thick layers of epithelium on a fine basement membrane which forms branching processes: there is no ingrowth or any infiltration of the deeper parts.

TUBULAR ADENOMA OF PAROTID.

236. Section of a Tumour removed from the Parotid Gland. It consists of a series of collections of round gland cells, arranged more or less in solid columns or rods; these branch frequently, and are separated from each other by a fine connective-tissue stroma: in places some of the cells of the columns are undergoing hyaloid degeneration: there is no cartilage present. Although these tumours in structure bear a great resemblance to some forms of carcinoma, clinically they are found to be innocent in character.

The tumour is preserved in Series xiv. No. 1832b, to which refer.

PAPILLOMA OF TONSIL.

- 237a. Section of a Papilloma of the Tonsil. It consists of branching processes of lymphatic tissue, covered by a thin layer of stratified epithelium.

ULCERATIVE COLITIS.

- 254a. A longitudinal section through the coats of the ascending colon from a case of Ulcerative Colitis. The mucous membrane has been

almost completely removed by ulceration, only small islets of it remaining here and there, giving rise to the name "Colitis Polyposa." The section shows one of these "polypi" still containing mucous membrane in the centre of a large area of ulceration.

The section was imbedded in celloidin before cutting.

See *Medical Post-Mortem Register*, vol. xx. p. 369, also *Transactions of the Pathological Society*, vol. xlv. p. 66.

- 254b. A similar section of the descending colon, taken from the same case as the preceding specimen.

The two preceding specimens were prepared and presented by Howard Tooth, M.D.

- 254c. Sections through one of the Polypi growing in a portion of the ascending colon which was removed by operation. They consist only of hypertrophied mucous membrane.

The portion of intestine excised is preserved in Series xviii. No. 2027e, to which refer.

- 265b. A section of a Columnar-Celled or Adenoid Carcinoma of the cæcum which was removed by operation. The growth has involved the muscular layers of the bowel.

The specimen from which the sections were obtained is preserved in Series xviii. No. 2027d.

- 265c. Section of a Columnar-Celled Carcinoma of the large intestine. The carcinoma is in an early stage, no colloid degeneration having as yet occurred.

From a case in which resection of the cæcum was performed. The specimen is preserved in Series xviii. No. 2027f, to which refer.

COLLOID DEGENERATION OF CARCINOMA.

- 266a. A section of a very large Carcinoma of the ascending colon which has undergone extensive colloid degeneration. Owing to the extent to which the degenerative process has reached, very few gland cells remain, the spaces between the connective tissue stroma being now occupied with clear cells containing colloid material which only stains feebly.

The tumour from which the sections were obtained is preserved in Series xviii. No. 2027g, to which refer.

- 271b. A section through the whole thickness of the coats of the rectum, from a case of General Ulcerative Colitis. In many places the whole of the layer of mucous membrane has disappeared.

The section was imbedded in celloidin before cutting.

See *Medical Post-Mortem Register*, vol. xx. p. 318, also *Transactions of the Pathological Society*, vol. xlv. p. 66.

291. Sections of the walls of a Cystic Tumour removed by operation from the inguinal region of a young woman. It consists mostly of fibrous

tissue, amongst which are a few bundles of striped muscular fibres. It contains no ovarian tissue.

The tumour is preserved in Series xx. No. 2113c, to which refer.

- 352a. A transverse section through the Thyroid Gland and deep structures of the neck of a six months' foetus. The vesicles of the gland are well-formed, and some of them already contain colloid material.

ATROPHY OF THYROID IN MYXCEDEMA.

- 352b. Section of a Thyroid Gland in a condition of extreme atrophy, from a patient who died from Myxœdema. It consists entirely of fibrous tissue, and now shows no traces of gland tissue or of colloid material.

The gland is preserved in Series xxvi. No. 2317b.

- 371a. Section of a Kidney in a condition of Acute Inflammation. Many of the tubules and Malpighian bodies are closely filled with blood-cells.

See *Medical Post-Mortem Register*, vol. xx. p. 333.

CARCINOMA OF KIDNEY.

- 389a. A section of a Carcinoma of a Kidney which was removed by operation. Its structure consists of a number of papillary processes composed of a fine connective-tissue groundwork branching in all directions, each process being covered with a layer of short columnar cells. These processes grow out into the surrounding tissue, forming more or less distinct cysts.

One half of the kidney from which the sections were taken is preserved in Series xxviii. No. 2392d, to which refer.

- 542b. Sections of the right (*a*) and left (*b*) Testicle, from a case of Hermaphroditism in the male. (See Teratological Catalogue, No. 3671b.) Neither testis had descended into the scrotum. In both the membrana propria of the seminiferous tubules is unduly thickened.

562. A Section of the Prostate from a case of Hermaphroditism (see Terat. Cat., No. 3671b), showing compound racemose glands.

593. A section of the wall of the Male Uterus from a case of Hermaphroditism (see Terat. Cat., No. 3671b). The section was not cut when the specimen was fresh, but the presence of uterine glands can be clearly seen.

EPITHELIOMA OF CLITORIS.

- 622a. Section of an Epithelioma of the Clitoris removed by operation; it shows numerous ingrowths from the surface epithelium with typical "cell-nests."

- 637a. Section of a Fibro-Adenoma of the Male Breast. It consists mostly of dense fibrous tissue, with here and there a few gland tubules.

From a young man aged 20. The whole breast was affected and was removed.

RODENT ULCER.

- 771b. A section of a Rodent Ulcer which grew at the angle of the Mouth. The section does not show a quite normal type of the disease, in that the centre of most of the small-celled masses is occupied by "keratinous cells," somewhat resembling, though in reality quite distinct from, "cell-nests."

From a man aged 48, of whose face a drawing is preserved in Series lvii. No. 1288.

See also *Male Surgical Register*, vol. v. (1886), No. 1393.

- 773a. Section of a Rodent Ulcer, removed by operation from a man's cheek. At the edge of the growth the sebaceous glands of the skin are a good deal enlarged.

From a man aged 24 at the time of the operation; he had noticed it for over four years, so that it must have commenced while he was only 19 years of age.

A drawing is preserved in Series lvii. No. 1293, to which refer.

- 773b. Section of a Rodent Ulcer. It shows the usual collections of small-celled masses. In the deeper parts these collections are joined by branching processes of similar cells, forming irregular "Stellate" masses.

From a woman aged 55. The growth occurred at the outer canthus of the left eye, and had existed for thirty-one years.

See *Female Surgical Register*, vol. ii. (1887), No. 1009.

RODENT ULCER (EARLY).

- 775a. Section through a small nodule in the skin. It appeared to be pigmented. Microscopically its structure is that of a Rodent Ulcer into which a slight amount of blood has been extravasated. The collections of small-celled ingrowth lying in the deeper parts of the true skin are well seen. The epidermis is still intact, so that at present there is no ulceration.

LYMPHANGIOMA CIRCUMSCRIPTUM CUTIS.

- 777a. A section of the deeper part of a Tumour removed from the Axilla, consisting of numerous communicating spaces with thin walls composed of fibrous tissue, lined by a delicate layer of endothelium. When fresh these mostly contained lymph. There has been effusion of blood into some of the spaces.

The tumour is preserved in Series l. No. 3366b.

- 806a. Crystals of Cystin.

Presented by Archibald Garrod, M.D.

MADURA FOOT.

823. A series of five sections prepared by staining with various reagents, to show the black variety of the fungus (probably the same as in Actinomycosis) found in "Madura" disease of the foot.

- 823a. A section to show the yellow variety of the same disease.

Prepared by A. A. Kanthack, M.D.

ACTINOMYCOSIS.

- 825a. A section through a portion of the Tongue of a heifer infected with *Actinomyces Bovis*. The section has been specially stained to show the mycelium (blue) and the spores (red).

One half of the tongue is preserved in Series 1. No. 3382e, to which refer.

CHOLERA.

845. A slide prepared from a pure cultivation of the Cholera Bacillus, obtained from a man who died of the disease in the Hospital.

See *Medical Post-Mortem Register*, vol. xix. p. 239.

SERIES LVI.

CASTS AND MODELS.

CONGENITAL HYPERTROPHY OF FEET.

- 1c. Casts of the feet and legs of a little girl aged four years. The feet and toes are enormously hypertrophied in all directions. The feet are greatly thickened, and the toes, besides being greatly enlarged, are widely separated from each other, so that the great toe resembles a thumb. On all the toes the nail is short and stunted.

The patient had been under the observation of Mr. D'Arcy Power since her birth. The face, body, and hands (see next specimen, No. 1d) were of the normal size and shape. The disproportion between the size of the feet and the rest of the child had gradually diminished. The child could walk well.

- 1d. Cast of the right hand of the child from whom the preceding casts (No. 1c, to which refer) were taken.

CHARCOT'S DISEASE OF THE ANKLE.

- 20q. A cast of the lower part of the leg and left foot of a man who had Charcot's Disease, *i.e.*, great destruction of the component parts of some of his joints associated with Locomotor Ataxia.

From a man aged 44. His right knee was also affected; there was no history of syphilis.

See *Male Surgical Register*, vol. iv. (1893), No. 1252.

- 20r. Cast of the left foot of a man who suffered from Tabes Dorsalis. There is a considerable amount of swelling about the ankle and mid-tarsal joints, with shortening of the whole foot; it measured one inch less in length than the right foot. On the plantar surface of the great toe is the scar of a healed perforating ulcer.

From a man aged 38, who had suffered from syphilis twenty years previously. At the time the cast was taken he had a perforating ulcer under the great toe on the opposite foot.

See *Mark Ward Book* for 1894, sub Henry Snow.

- 20s. Cast of the right hand and forearm of an old woman, showing great distortion of the fingers from Chronic Rheumatoid Arthritis.

A drawing of the hand is preserved in Series lvii. No. 67a.

See *Female Surgical Register*, vol. v. (1894), No. 278.

- 24a. Cast of the upper part of the front of a man's chest, showing a deformity of the right clavicle.

From a young man aged 25. Six weeks previously he fractured his right clavicle at the junction of the outer with the middle third. He underwent no treatment of any kind. The bone united well, but in a bad position; the inner fragment lies in front of the outer, but on the same plane.

- 36c. Cast of the upper part of the front of a man's chest, showing a dislocation of the sternal end of the right clavicle.

- 42a. Cast of the left hand, forearm, and elbow of a boy aged six, who had a separation of the lower epiphysis of the humerus from the shaft.

See *Male Surgical Register*, vol. ii. (1893), No. 212.

- 59a. Cast of the back of a girl aged fourteen, showing a Lateral Curvature of the Spine. The mid-dorsal region is the part most affected. Here the concavity of the primary curve is on the right; the secondary, or compensatory curve, in the lumbar region is only seen indistinctly. The rotation of the spines of the vertebræ is towards the right, causing a bulging of the back part of the chest on the opposite side.

- 66f. Cast of the right hand of an infant, showing a congenital displacement of the whole hand towards the ulna.

Casts of the feet of the same child, which were in a condition of congenital talipes equinus, are preserved in this Series, No. 87e.

- 67b. Cast of the lower part of the front of the abdomen and upper part of the thighs of a young man who had ruptured the femoral attachment of the Adductor Longus Muscle on both sides.

The muscle, which was subsequently excised, is preserved in Series vi. No. 1169a, and a photograph in Series lvii. No. 144a.

See also *Male Surgical Register*, vol. iv. (1893), No. 3074.

DUPUYTREN'S CONTRACTION.

- 68f. Casts of the hands of a man aged fifty-nine, who suffered from "Dupuytren's Contraction" of the palmar fascia. In the right hand the little finger, and in the left hand the ring finger, is the most affected.

- 68g. Casts of the same hands one month after division of the contracted fascia. All the fingers are fully extended.

See *Male Surgical Register*, vol. v. (1893), No. 3252.

ENLARGED BURSA PATELLÆ.

- 70b. Cast of the right knee of a man aged fifty-nine, showing a greatly enlarged Pre-patellar Bursa. The swelling, which is sausage-shaped, measures seven inches in length. It was removed by operation.

See *Male Surgical Register*, vol. iv. (1894), No. 1440.

- 72f. Cast of the right hand, showing very marked "Clubbing of the Tips" of the fingers.

The patient was a young woman who suffered from heart disease.

- 73e. Cast of the right foot of a young man, showing in an extreme degree the deformity resulting from old Infantile Paralysis of the extensors of the foot. Owing to the contraction of the flexor muscles the foot has become so much distorted that the sole points directly upwards, and the man walked on the dorsum.

The foot was amputated at the patient's request.

- 73f. Cast of the left leg and foot of a child who had suffered from Infantile Paralysis. The foot is now in a condition of talipes equinus from permanent contraction of the flexor muscles. The toes are extended to a right angle on the metatarsus, so that the foot is in nearly the same position as that obtained by Mickulicz's operation.

From a little girl aged 7. The acute attack of inflammation resulting in the paralysis of the extensors of the leg occurred when she was two years of age.

- 85-1. Cast of the left foot of a boy aged ten years, who suffered from Talipes Equino-Varus of both feet.

- 85m. Casts of both feet of the same patient from whom the preceding cast (No. 85l) had been taken seventeen months previously.

See *Male Surgical Register*, vol. ii. (1891), No. 2587.

CONGENITAL TALIPES EQUINUS.

- 87e. Casts of the feet of an infant aged four months, who had Congenital Talipes Equinus, with, in addition, a slight amount of varus.

There was also a deformity of the right hand (see Cast No. 66f in this Series).

HALLUX VALGUS.

- 90b. Casts of the feet of a woman who suffered from Hallux Valgus. The left foot shows the result of excision of the head of the metatarsal bone, performed fourteen days previously. The great toe is now in good position.

The patient, aged 35, refused any operation on the right foot.

See *Female Surgical Register*, vol. ii. (1894), No. 1270.

- 93c. Cast of the right leg and foot of a child in a condition of extreme Talipes Valgus due to some deficiency of the external malleolus.

See *Male Surgical Register*, vol. i. (1894), No. 1475.

HAMMER TOES.

- 96d. Casts of the feet of a man who had contraction of the tendons of the second, third, and fourth toes of each foot, giving rise to the deformity known as "Hammer Toe." There is also considerable deformity of the great toes.

From a man aged 33, who had been a soldier. He stated that the deformity commenced eight years previously, while serving with the army during the Egyptian campaign of 1885.

See *Male Surgical Register*, vol. v. (1894), No. 225.

- 101b-i. Cast of the front of the left knee and thigh of a man aged forty, showing an extremely varicose and tortuous condition of one of the Superficial Veins, extending from below the outer side of the knee obliquely across the front of the thigh to the saphenous opening, where there is a firmly thrombosed pouch, as large as a hen's egg. The vein and pouch were subsequently removed by operation.

See *Male Surgical Register*, vol. ii. (1894), No. 557.

- 137b. Cast of the front of the abdomen of a woman who had Divarication of the Abdominal Muscles, causing a partial hernia. The part affected is the middle line from just above the umbilicus to the symphysis pubis. The protrusion only occurred when the abdominal muscles were put in action.

From a woman aged 25. The separation of the muscles came on subsequently to parturition.

See *Female Surgical Register*, vol. iv. (1894), No. 607.

- 138a-5. Cast of the Liver of a woman aged sixty-five, in which there appears to be an almost complete congenital absence of the left lobe. The right lobe, which is smaller than usual, is marked by a deep transverse constriction, due to tight lacing.

See *Medical Post-Mortem Register*, vol. xxi. p. 59.

- 138a-6. Cast of a liver greatly enlarged and infiltrated by Carcinoma. The whole surface is nodulated and irregular from numerous secondary deposits. The primary disease was situated in the pancreas.

See *Medical Post-Mortem Register*, vol. xxi. p. 71.

MYXŒDEMA.

- 138n. Cast of the face of a woman aged forty-seven, who had suffered from Myxœdema for many years. As frequently happens in these cases, several "moles," which were pigmented, were scattered over the face.

She was treated by thyroid extract in the Hospital with marked benefit. The cast was taken before the treatment was commenced; she then weighed 14st. 2lbs.

Casts of her hands taken at the same time are preserved in the next Specimen (No. 138-o), and a photograph is preserved in Series lv. No. 1176a.

See *Elizabeth Ward Book* for 1893, sub Sarah Manger.

- 138o. Casts of the hands of a woman suffering from Myxœdema. From the same case as the preceding specimen (No. 138n).

- 139a. Cast of a neck, showing a mass of enlarged Lymphatic Glands below the angle of the jaw on the left side.

From a young man aged 17. The glands were subsequently removed by operation.

HYDROCEPHALUS.

- 142b. Cast of the head of a child aged seven months, who died from Acute Hydrocephalus. It measures thirty-two and a quarter inches in circumference.

A drawing taken two months previously is preserved in Series lvii. No. 654. and its brain is preserved in Series xxx. No. 2516a.

PERFORATING ULCER.

- 178b. Cast of the right foot of a man who had previously suffered from three Perforating Ulcers. These have now healed, but the scars are still seen on the sole, one under the big toe, the others under the fourth and fifth toes. The ulceration involved the bones in each case, leaving as a result permanent and marked shortening of the toes involved.

From a man aged 43, who suffered from tabes dorsalis, and who died in the Hospital. Both feet were affected. The anterior part of the right foot is preserved in Series I. No. 3233c, and the macerated bones of the left foot in Series II. No. 691e. He had syphilis when twenty years of age.

See *Male Surgical Register*, vol. iv. (1893), No. 71.

ATROPHIC CARCINOMA OF BREAST.

- 197a. Cast of the front of the chest of a woman aged forty-eight, who suffered from "Atrophic" Carcinoma of the right breast. The right breast is much smaller than the left.

CARCINOMA OF BREAST.

- 197b. Cast of a very large Carcinoma of the right breast.

From a woman aged 37. The tumour increased during pregnancy from a small nodule to its present size. It was removed four weeks after confinement, and weighed 7 lbs.

See *Female Surgical Register*, vol. ii. (1894), No. 39.

DERMOID CYST OF THE NECK.

- 205a. Cast of the front of the neck of a woman aged forty-three, showing a rounded swelling just above the episternal notch: it was quite soft, and proved to be a Dermoid Cyst: it was removed by operation.

See *Female Surgical Register*, vol. ii. (1894), No. 672.

FIBROMA OF PINNA.

- 212c. Casts of the ears of a man, in each of which there is a large Fibroma of the pinna. The growth, which was tough and firm to the touch, had apparently formed between the skin and cartilage on both surfaces, so that the edge of the pinna projects outwards instead of lying flat against the head: the auditory meatus was very much encroached upon, but there was no impairment of hearing.

From a man aged 38, who had been a professional athlete: he stated that four years previously he had a hæmatoma of each ear from blows received in a fight, which did not subside, but developed into these firm swellings.

SERIES LVII.

DRAWINGS AND PHOTOGRAPHS OF DISEASED OR INJURED PARTS.

- 67a. Drawing of the right hand and forearm of an old woman. The whole hand is greatly distorted, the fingers are swollen, and contracted

on to the palm, and the nails are long and twisted. The muscles of the forearm are greatly wasted. (Leonard Mark, Esq.)

From a woman aged 52, but who appeared much older : she had suffered from rheumatic arthritis, which entirely disabled her right hand ; it had not been washed for three years.

A cast of the hand is preserved in Series lvii. No. 20s.

See *Female Surgical Register*, vol. v. (1894), No. 278.

- 143a. A photograph of the same patient shown in the preceding photograph (No. 143), but taken a few months subsequently : there is considerable improvement in her condition, due to treatment by massage and electricity : the heels are now at some distance from the buttocks, and the glutei and muscles of the back have much increased in size.

For details of the case see a paper by Sir Dyce Duckworth in the *St. Bartholomew's Hospital Reports*, vol. xxviii. p. 263.

- 144a. A photograph of the lower part of the trunk and upper part of the thighs of a young man who had ruptured the femoral attachment of his Adductor Longus Muscle.

The muscle, which was excised, is preserved in Series vi. No. 1169a, and a cast of the parts in Series lvi. No. 67b.

See *Male Surgical Register*, vol. iv. (1893), No. 3074.

PERICARDITIS.

- 150a. Drawing of a heart, showing a peculiar condition of the visceral layer of the pericardium, due to recent Acute Inflammation : the sac of the pericardium has been laid open, but the heart has not been removed : the parietal layer shows but little change from the normal, while the layer covering the heart has a bright yellow appearance, as though it were covered by a thin coating of fat. (Leonard Mark, Esq.)

- 205a. Drawing of the neck of a woman aged thirty-one, who had an oval swelling on the left side of her neck, in communication with the external jugular vein of that side. (Leonard Mark, Esq.)

CLOT IN PHTHISICAL CAVITY.

- 268a. Drawing of the right lung of a patient who died of Phthisis : the lung has been incised, thereby disclosing in the apex a cavity containing a more or less globular blood-clot : this lies free in the cavity, which it nearly fills. (Leonard Mark, Esq.)

A portion of the lung containing the clot is preserved in Series xi. No. 1725a.

See *Medical Post-Mortem Register*, vol. xxi. p. 25.

THROMBOSIS OF PULMONARY ARTERY.

- 276a. Drawing of a heart, the right side of which has been laid open to show a long cylindrical recent blood-clot lying in the right ventricle, and extending up into the four main branches of the pulmonary artery. (Leonard Mark, Esq.)

From a man who died of pneumonia.

See *Medical Post-Mortem Register*, vol. xx. p. 380.

SUBLINGUAL CYST.

- 318a. Drawing of the inside of the mouth of a man who had a large Sublingual Cyst, displacing the Tongue upwards on to the roof of the mouth. (Leonard Mark, Esq.)

From a man aged 46, who stated that the cyst had existed all his life: it caused no inconvenience beyond a slight impediment in his speech, and he had always refused to undergo any operation for its removal. At the time the drawing was made he was suffering from advanced phthisis.

- 321a. Drawing of a small Lymphangioma of the tongue. It occupies the centre of the dorsum. It was freely removed. (Leonard Mark, Esq.)

From a little boy aged 5.

See *Male Surgical Register*, vol. iv. (1893), No. 966.

- 358a. Drawing of the face and neck of a man who suffered from a malignant stricture of the œsophagus, with a secondary infiltration of the deep lymphatic glands on the right side of the neck. The drawing shows a considerable swelling in this situation; as a result, the cervical sympathetic of this side became paralysed, causing narrowing of the palpebral fissure, with contraction of the pupil. (Leonard Mark, Esq.)

For details of the case see *Male Surgical Register*, vol. v. (1893), No. 351.

DIPHTHERITIC MEMBRANE IN THE STOMACH.

- 402a. Drawing of the interior of the stomach of a child who died from Diphtheria. The stomach has been laid open along the greater curvature: the mucous membrane is acutely inflamed. In several places there are patches of grey sloughing false membrane, the largest of which is near the pylorus. (Leonard Mark, Esq.)

See *Medical Post-Mortem Register*, vol. xxi. p. 28.

- 424a. Drawing of the mucous surface of a piece of large intestine, showing several small dark patches from which hæmorrhage had recently occurred. (Leonard Mark, Esq.)

RUPTURED LIVER AND KIDNEY.

- 507a. Drawing of a Liver, showing a very extensive rupture of the right lobe, and of a Kidney with a transverse rupture extending into the hilum. (Leonard Mark, Esq.)

- 596a. Drawing of the leg of a man, showing the deep bronzing of the skin which occurs in Addison's disease. (T. Godart.)

650. Drawing of a Diffuse Papilloma of the Bladder. The bladder has been turned inside out. Nearly the whole of the mucous membrane is covered by a rough shaggy growth. (Leonard Mark, Esq.)

The specimen is preserved in Series xxix. No. 2419b, to which refer.

- 713a. Drawing of a traumatic meningocele situated in the parieto-occipital region, on the right side of the head of a child aged eleven months. (Leonard Mark, Esq.)

See *Female Surgical Register*, vol. ii. (1893), No. 155.

DEGENERATIVE CYSTS OF RETINA.

755. Drawing of the posterior half of an eye, showing three small cysts in the Retina, which has become partially detached. (Leonard Mark, Esq.)

The specimen is preserved in Series xxxiii. No. 2667a, to which refer.

DERMATITIS HERPETIFORMIS.

- 773a. Drawing of the front of the abdomen of a girl aged thirteen, showing a number of small shallow ulcers covered by yellowish crusts, and scattered irregularly over the skin. They are rather more numerous on the right side than on the left, but occur on both sides of the middle line. (Leonard Mark, Esq.)

See *Elizabeth Ward Book* for 1892, sub Emily P. Tower.

- 773b. Drawing of the front of the leg of a woman aged thirty-seven, showing several shallow ulcers covered by crusts, together with some small bullæ, occurring during an attack of dermatitis, giving rise to the condition known as Dermatitis Herpetiformis. (Leonard Mark, Esq.)

From an out-patient in the Department for Diseases of the Skin.

- 777a. Photograph of a young woman who suffered from Urticaria Pigmentosa of both arms and forearms.

Presented by A. A. Bowlby, Esq.

LICHEN PLANUS RUBER.

- 786a. Drawing of the right side of the chest and shoulder of a man aged twenty-four. The skin round the axilla is red and raised, and in a warty condition: there are other similar patches on the shoulder and side of the chest, but the skin is not quite so much thickened: numerous dark discoloured patches, without any thickening of the integument, occur elsewhere, especially on the upper arm: it was considered to be a case of Lichen Planus Ruber. (Leonard Mark, Esq.)

The disease had existed for four years.

See *Male Surgical Register*, vol. ii. (1894), No. 1368.

LICHEN PILARIS.

- 788a. Drawing of the lower part of the trunk and upper part of the thigh of a child aged eight, showing an unusual form of Lichen Pilaris. (Leonard Mark, Esq.)

The eruption, which was abundant over the neck, trunk, and limbs, had existed for a year; sometimes it caused itching.

HERPES.

- 795a. Drawing of the face and palate of a young woman aged twenty-seven, showing a series of superficial ulcers due to Herpes on the right side of her nose, cheek, upper lip, and soft palate. Some of the ulcers are partially healed: all are situated to the right of the middle line. (Leonard Mark, Esq.)

796a. Drawing of the upper part of the left side of the chest of a woman aged sixty-four, showing an eruption due to Herpes Zoster. The skin is more widely affected than usual, and in many places the patches are in an ulcerated and sloughy condition. (Leonard Mark, Esq.)

The vesicles first appeared thirteen days previously: the ulceration quickly yielded to simple treatment.

From an out-patient under the care of Dr. Lauder Brunton.

PEMPHIGUS.

802a. Drawing of a pustular eruption occurring on the flexor surface of the left forearm. It began by the appearance of a few small bullæ, which quickly became pustular: many of these have burst and now form crusts: the surrounding skin is red and inflamed. (Leonard Mark, Esq.)

From a man aged 34, who had occasionally had similar attacks during the past ten years.

804c and d. Two drawings of a Bullous Eruption occurring on the arm and thigh. Some of the bullæ have burst, leaving superficial ulcers which are partly covered by dark crusts. The skin around the bullæ is red and inflamed; this is most marked in the drawing of the thigh. (Leonard Mark, Esq.)

From an old man aged 70.

See *Mark Ward Book* for 1894, sub Louis Abraham.

822a. Drawings of the legs of a lady aged thirty, showing a marked ichthyotic condition of the skin. The epidermis is greatly thickened and cracked, forming thick irregular scales of a yellowish-brown colour. (Leonard Mark, Esq.)

From a lady who became completely bedridden, with partial ankylosis of most of the joints of her limbs, following on a severe attack of puerperal septicæmia.

Presented by Alfred Willett, Esq.

CUTANEOUS HORN.

823a. A photograph of the face and neck of a girl aged eleven, showing a small Cutaneous Horn growing from about the middle of the right sterno-mastoid muscle. It had attained its size in seven weeks.

The horn is preserved in Series xxxv. No. 2693c.

MORPHŒA.

832a. Drawing of the face of a girl aged sixteen, who had two circumscribed patches of Morphœa on her face. One extends upwards from the root of the left side of the nose in two streaks on to the forehead, the other forms a small circular patch on the left ala of the nose. (Leonard Mark, Esq.)

The patches had been first noticed two years previously, since which time they had been slowly spreading.

LUPUS ERYTHEMATOSUS.

835a and b. Two drawings, profile (A) and full-face (B), of the face of a man who had a large symmetrical patch of Lupus Erythematosus on his

face, involving the nose and the greater part of both cheeks as far as the ear. (Leonard Mark, Esq.)

The patient was aged 45, and had been a sailor; he had suffered from the affection for $3\frac{1}{2}$ years.

See *Male Surgical Register*, vol. ii. (1894), No. 1234.

XANTHELASMA.

- 838a. Drawing of the upper part of the face of a child, showing small scattered nodules of Xanthelasma on the upper part of each cheek. There is a cyst on the left upper eyelid. (Leonard Mark, Esq.)

From a child aged 8. The affection had lasted about five years.

See *Female Surgical Register*, vol. iii. (1894), No. 1177.

- 869a. Drawing of the face of a boy aged twelve, who had a symmetrical eruption (?purpuric) of the supra- and infra-orbital regions. (Leonard Mark, Esq.)

See *Matthew Ward Book* for 1892, sub Frederick Merryweather.

"TACHES BLEUÂTRES."

- 898a. A drawing of the abdomen of a youth aged sixteen, showing the Bluish Spots (Taches Bleuâtres) which appeared during an attack of typhoid fever. (Leonard Mark, Esq.)

See *John Ward Book* for 1892, sub William Wright.

DRUG RASH.

- 917a. Drawing of the inner side of the left thigh of a man aged sixty-three, showing a rash which occurred after the administration of Iodide of Potassium. There were several small patches of vesicles, surrounded by a large area of papular eruption. The rash entirely disappeared in a fortnight. (J. Morison, Esq.)

- 923a. Drawing of the face of a man suffering from a rash caused by the administration of Bromide of Potassium. On the tip of the nose, cheeks, and around the eyes are a number of large vesicles filled with puriform fluid. There are also a few on the forehead. (C. D. Alton.)

Presented by Samuel West, M.D.

- 929a. Drawing of a Chondro-Sarcoma of the testis. (T. Godart.)

The testicle is preserved in Series xxxvi. No. 2783, to which refer.

- 929b. Drawing of a Sarcoma of the testis, which contained nodules of cartilage.

SEBACEOUS HORN OF PENIS.

- 959a. Drawing of a Sebaceous Horn attached to the left side of the corona of the glans penis.

From a man aged 48, who had been circumcised seven months previously. It was removed by operation, and is preserved in Series xl. No. 2888a.

See *Male Surgical Register*, vol. iii. (1894), No. 169.

Drawn and presented by N. O. Wilson, Esq.

959b. Photograph of the same case as the preceding drawing (No. 959a).

994a. Drawing of a sagittal section through the pelvic organs of a woman who died from Anterior Perimetritis. Between the uterus and bladder is a large cavity, which was filled with pus. (T. Godart.)

The Specimen is preserved in Series xliii. No. 2945a, to which refer.

1046a. Drawing of the right side of the chest and axillary region of a woman from whom the right mammary gland had been removed six months previously for Scirrhus Carcinoma. The scar itself shows little or no signs of recurrence, but there are several small nodules in the skin over the pectoralis major. In addition to these, the surrounding skin is affected in a peculiar manner; though not ulcerated, it is red and inflamed over an area measuring eight or ten inches in diameter, with a sinuous but well-marked boundary-line, which could be clearly defined by the touch. A portion of this skin was removed, and was found, on microscopical examination, to be infiltrated with carcinoma. (Leonard Mark, Esq.)

For a history of the case see *Female Surgical Register*, vol. iii. (1892), No. 1397.

1046b. A drawing of the back of the same woman from whom the preceding drawing (No. 1046a) was made, and showing a similar infiltration of the skin. (Leonard Mark, Esq.)

PERFORATING ULCER.

1072a. Drawing of the left foot of a man aged forty-seven. As the result of a perforating ulcer of long standing, the great toe has entirely disappeared, leaving an ulcerated area measuring nearly two inches in diameter. (Leonard Mark, Esq.)

See *Male Surgical Register*, vol. ii. (1893), No. 2151.

1072b. Drawing of the left foot of a man aged forty-three, who had previously suffered from a perforating ulcer of the foot, with considerable destruction of the bones of the little toe: the whole foot had recently been acutely inflamed: there are the scars of two partly healed incisions immediately above and below the ankle. (Leonard Mark, Esq.)

The patient subsequently died. The macerated bones of the foot are preserved in Series ii. No. 691e.

See *Male Surgical Register*, vol. iv. (1893), No. 71.

CANCERUM ORIS.

1078a. Drawing of the face of a child who died from Cancrum Oris. The greater part of the right cheek is destroyed, a black slough extending from the angle of the mouth over the ala of the nose up to the inner canthus of the eye; there is also a small superficial slough below the angle of the mouth on the left side. (Leonard Mark, Esq.)

See *Faith Ward Book* for 1894, sub Harriet Wright.

1079a. A drawing, taken after death, of the head and shoulders of a child aged four, who died with gangrene of the right ear and surrounding skin. (Leonard Mark, Esq.)

RAYNAUD'S DISEASE.

- 1097a. Drawing of the face of the girl, aged seventeen, whose hands are depicted in the preceding drawing (No. 1097). The skin of both cheeks and around both eyes is of a dark purplish-red. (Leonard Mark, Esq.)

See *Elizabeth Ward Book* for 1888, Index, No. 192.

- 1102a. Three drawings of the feet of a child suffering from Symmetrical Gangrene of the Toes. (A. H. Stevens, Esq.)

From the same case as the preceding drawing (No. 1102).

TUBERCULAR ULCER.

- 1105a. Drawing of the face of a young woman aged twenty-nine, showing a circular ulcer with raised edges measuring about one inch in diameter on the left cheek. (Leonard Mark, Esq.)

The ulcer was excised and found to be tubercular in nature.

See *Female Surgical Register*, vol. i. (1893), No. 1450.

LEPROSY.

- 1114a. A series of four photographs of groups of lepers from the Leper Hospital at Nicosia, Cyprus.

Presented by Guy Stephen, Esq.

VARIOLA.

1116. A series of twelve photographs of patients suffering from small-pox, illustrating the different stages of the disease from the fifth to the twenty-fifth day, and showing in a marked degree the differences in severity that occur between vaccinated and unvaccinated patients.

The photographs were taken by Dr. J. H. Lightbody on the Hospital Ships in Long Reach at the mouth of the Thames in the spring of 1893.

Presented by J. H. Lightbody, M.B.

SECONDARY SYPHILIS.

- 1128a. Drawing of the face of a young woman showing a Secondary Syphilitic Rash round the nose and at the angle of the mouth on the left side. (Leonard Mark, Esq.)

The patient was aged 21, and had been married eight months: she had had a bad miscarriage seven weeks before the drawing was made: she was also suffering from ulceration of the tongue and larynx.

- 1128b. Drawing of the front of the abdomen of a young woman, showing several darkly pigmented patches over the right inguinal region, caused by the fading of a Secondary Syphilitic Rash. (Leonard Mark, Esq.)

TERTIARY SYPHILIS.

- 1145a. Drawing of the leg of a woman aged thirty, showing a Tertiary Syphilitic Ulceration of the skin in the neighbourhood of the knee. (Leonard Mark, Esq.)

See *Female Surgical Register*, vol. v. (1894), No. 747.

GOUT.

- 1160a. Drawing of the head of a youth aged eighteen, who had Gouty Tophi in both ears. (A. F. Stevens, Esq.)

The case is recorded by Sir Dyce Duckworth in the *Clinical Society's Transactions* for 1893.

Presented by Sir Dyce Duckworth, M.D.

CRETINISM.

1177. Three photographs of a child aged six and a half years, the subject of Sporadic Cretinism. (D. W. Collings, Esq.)

For further particulars see *Elizabeth Ward Book* for 1893, sub Mary Ann Humbleton.

LIPOMA.

- 1190a. Drawing of a very large Lipoma growing from the right gluteal region. (T. Godart.)

- 1194a. Two photographs (profile and from behind) of a man who suffered from Diffuse Lipoma of the neck.

See *Male Surgical Register*, vol. v. (1893), No. 3012.

- 1194b. Two photographs of the same patient after removal of the swellings by operation.

NÆVUS.

- 1200a. A coloured photograph of a girl aged fifteen, showing a large congenital Nævus affecting both right limbs, and a large area on the right side of the trunk.

The girl stated that she was born with the deformity: it then extended also over the right half of the scalp, face, and neck, from which situations it had slowly disappeared.

For further details see *Clinical Society's Transactions*, vol. xxvi. p. 243.

Presented by J. Fletcher Little, M.D.

SARCOMA.

- 1214a. Drawing of a Sarcoma occurring on the cheek of an old woman. It is of a dark red colour from the escape of blood, is nearly circular, and measures two inches in diameter. It had a broad base, and was removed by operation. Microscopical examination proved it to be a round-celled sarcoma. (Leonard Mark, Esq.)

See *Female Surgical Register*, vol. ii. (1894), No. 20.

- 1232a. A drawing, taken in March 1893, of the back of the head of a young man who suffered from "Withering Sarcoma" of the scalp. The tumours have much diminished in size since the first drawing (No. 1232) was made, three years previously. (Leonard Mark, Esq.)

- 1253a. Two drawings showing a Melanotic Sarcoma, which grew at the angle of the mouth, on the mucous membrane of the lip, and on the alveolar border of the upper jaw on the left side. (Leonard Mark, Esq.)

The patient was a woman aged 50.

See *Female Surgical Register*, vol. ii. (1892), No. 788.

EPITHELIOMA.

- 1265a. Drawing of the face of a man aged forty, who had an extensive Epithelioma involving the angle of the mouth on the right side. (Leonard Mark, Esq.)

The disease was considered to be too extensive for any surgical interference.
See *Male Surgical Register*, vol. ii. (1893), No. 17.

1304. Two drawings of a Congenital Cyst, which grew from the region of the coccyx.

A shows the relative size and position of the cyst with reference to the surrounding structures.

B shows the appearance of the interior of the cyst, which was partially filled by a peculiar nodulated growth. (Leonard Mark, Esq.)

The specimen is preserved in Series I. No. 3373a, to which refer.

- 1312a. A drawing from a case of Ectopia Vesicæ.

For details of the case see a paper by Dr. Champneys in *St. Bartholomew's Hospital Reports*, vol. xiii.

The specimen is preserved and described in the *Teratological Catalogue*, Series vii. No. 3667.

ECTOPIA VESICÆ INCOMPLETA.

- 1312b. Drawing of the front of the abdomen of a little boy who had Incomplete Extroversion of the Bladder. There was a globular swelling between the umbilicus and symphysis pubis, which consisted of the bladder covered by skin, but protruding through a cleft in the abdominal walls.

The child could retain his urine.

- 1313a. Drawing of the front of the abdomen of a girl who had Extroversion of the Bladder. (A. M. McWhinnie, Esq.)

TRANSPOSITION OF VISCERA.

1317. A drawing of the thoracic and abdominal viscera, in which all the organs are transposed to the side opposite to that on which they are normally placed.

- 1322a. Drawing of the front of the chest of a man aged thirty-one, who had a supernumerary nipple on each side, situated at about two inches below the normal nipple.

From a patient in John Ward under Dr. Jeaffreson in 1866.

PROPTOSIS.

1331. Drawing of the head and face of a child aged one day, showing a condition of extreme congenital Proptosis and Microcephalus. More than the anterior half of the globe of the eye on each side was quite uncovered by the eyelid. There was great chemosis, and very considerable opacity of both corneæ. The eyes could be moved independently of each other. Though the eyelids could be drawn over the eyes with difficulty, they retracted again at once when not held in position. The prominence of the eyes seemed largely due to the fact that the orbital

plates of the frontal bones were only partially developed. (Leonard Mark, Esq.)

From a female child born at full time. The eyelids were subsequently drawn forward and held in position by sutures. The drawing was made fifteen hours after birth. The child survived for one month.

One half of the head is preserved in the Teratological Series, No. 3426a.

A cast of the head, taken after death, is preserved in the *Teratological Catalogue*, Series xxxvii. No. 56a.

- 1331a. Drawing in sepia of a median vertical section, passing through the centre of the right eye, of the head of the child depicted in the preceding drawing (No. 1331). It shows the almost entire absence of the orbital plate of the frontal bone. (Leonard Mark, Esq.)

The specimen is preserved in the Teratological Series, No. 3426a, to which refer.

SPINA BIFIDA.

- 1335a. Drawing of the back of a child aged five days, who had a Spina Bifida in the lumbo-sacral region. The skin has sloughed, and the interior of the spinal canal is exposed. (Leonard Mark, Esq.)

POST-MORTEM DISCOLORATION.

1355. Drawing of the face of a man to show the appearance caused by very rapid post-mortem decomposition. It was made thirty-six hours after death during the hot weather of the summer of 1893 (June 13th). (Leonard Mark, Esq.)

The man fell from a scaffold, and one of the poles entered the rectum, causing rupture of the liver and other severe internal injuries.

TERATOLOGICAL CATALOGUE.

SERIES I.—ABNORMAL CONDITIONS OF THE AXIS.

CLASS V.—ARREST OF DEVELOPMENT.

Sub-Class I.—Cranial Arrest.

MICROCEPHALUS AND PROPTOSIS.

- 3426a. The left half of the head of an infant, the subject of congenital Microcephalus and Proptosis. A perpendicular section has been made, passing through the occiput behind, and through the centre of the right eye in front. The most striking feature is the peculiar conformation of the head, which is very short from before backwards, but of considerable height, especially in the frontal region. This is due principally to the fact that the horizontal plate of the frontal bone has assumed a perpendicular position, with the result that there is no roof to the orbit. The cut surface shows that the plane of the vertical plate of the frontal bone falls behind the globe of the eye, and that there is

very little or no cavity of the orbit. The eyes are now rather less prominent than when the child was born, owing to the fact that the eyelids were sewn together during life in order to protect the corneæ, which were becoming hazy.

The cut surface also shows that the fornix, corpus callosum, and frontal convolutions are all perpendicular instead of horizontal.

The child (a female) was born at full term after an easy delivery; she was the seventh child, and lived for one month.

A drawing of the appearance on the day it was born is preserved in Series lvii. No. 1331; and a cast of the head is in the Teratological Series, xxxvii. No. 56a.

SUB-CLASS V.—DEFECTIVE CLOSURE OF THE AXIAL CANAL OF THE CEREBRO-SPINAL SYSTEM.

(C.) *Spina Bifida.*

3486a. Some of the fluid, measuring about one ounce, which was withdrawn by means of an aspirator from the sac of a *Spina Bifida* in the lumbo-sacral region. It is opalescent, and when fresh was alkaline in reaction, with a specific gravity of rather less than 1005. There is a slight sediment.

From an infant aged six weeks.

See *Male Surgical Register*, vol. ii. (1891), No. 2581.

SERIES VI.—ABNORMAL CONDITIONS OF THE DIGESTIVE ORGANS.

V.—ARREST OF DEVELOPMENT.

CONGENITAL CYST IN CONNECTION WITH THE RECTUM.

3648b. The Pelvic Organs, together with the Kidneys and Ureters, of a female infant. Attached to the posterior wall of the rectum, and projecting forwards so as to encroach on the lumen of the bowel at the brim of the pelvis, is an oval cyst, measuring nearly two inches in its long diameter. It has been laid open, and it is seen that its walls are fairly thick. A small fibrous cord joins the lower part of the cyst to the posterior margin of the anus. Both ureters and the pelves of both kidneys are dilated owing to the pressure of the cyst, which blocked the pelvis and obstructed the flow of urine into the bladder. In front of the bladder is a piece of skin in which is a recent laparotomy wound.

The infant was aged 23 months: the abdomen was opened the day before death to relieve the intestinal obstruction.

Microscopical examination showed that the cyst was lined by several layers of cells, the innermost of which were columnar and ciliated: the cyst itself was considered to have been developed from the remains of the post-anal gut.

See *Transactions of the Pathological Society*, vol. xlv. p. 216.

Presented by D'Arcy Power, Esq.

SERIES VIII.—ABNORMAL CONDITIONS OF THE GENERATIVE ORGANS.

CLASS V.—ARREST OF DEVELOPMENT.

I.—IN THE HUMAN SUBJECT.

(a.) *In the Male.*

DOUBLE OR VERTICAL HERMAPHRODITISM.

3671b. The Bladder and Internal Generative Organs of a man in whom neither testis had descended into the scrotum, and in whom the uterus masculinus and vagina are developed to a very unusual degree.

The uterus, nearly as large as in the adult female, occupied a position between the bladder and rectum, and was enclosed between two layers of peritoneum which stretched transversely across the pelvis as does the broad ligament in the female; it covered the posterior surface of the uterus, extending down for two and a half inches from the fundus, from which point it was reflected on to the anterior surface of the rectum, forming a well-marked "pouch of Douglas." The rectum has been removed, as also has a good deal of the posterior layer of the broad ligament, especially from over the left testis and its surrounding parts. Projecting from, but covered by the posterior layer of the broad ligament, are two oval bodies which occupy the usual position of the ovaries. Of these the left is nearly twice as large as the right: they have been incised and are propped open by short blue glass rods: their structure is obviously testicular, as verified by microscopical examination (see below), and a number of vasa efferentia pass off from the body of the testis to form the globus major of the epididymis: from the globus minor, which is placed above the globus major, proceeds on either side a convoluted vas deferens. This passes to the side of the uterus, rather on the anterior surface, and after becoming slightly dilated, is lost in the muscular tissue of the vaginal wall. The tunica vaginalis of each side has been laid open and hangs at the side of the specimen. The uterus has been laid open from behind; its cavity presents the usual triangular shape, and from each cornu there proceeds a strong band of muscular fibres (?cremasteric), which pass forwards to the internal abdominal ring, thence through the inguinal canal, through the external abdominal ring, and spread out on the posterior wall of the empty tunica vaginalis. This band of muscular fibres, therefore, occupies the position of the "round ligament." At the point where it leaves the cornu of the uterus is another but smaller rounded cord, in the position and of the size of the "Fallopian tube;" it is, however, solid; it terminates on the globus major of the epididymis, the spot at which the hydatid of Morgani (the remains of the fetal "duct of Müller") is found in the adult male. The lower portion of the cavity of the uterus presents no cervix, but there is a slight constriction, below which it dilates into an oval cavity,

measuring one and a half inches across, and nearly two inches vertically; it contained a whitish débris of uncertain character (see specimen, No. 3671c), and undoubtedly corresponds to the vagina. Through an orifice at its lower extremity a bristle has been passed, which escapes at the sinus pocularis in the prostatic portion of the urethra. There are no vesiculæ seminales. The prostate is flattened from side to side, but is otherwise well formed. The bladder and ureters are normal, as also were the kidneys.

From a man aged 44, who was admitted into the Hospital with signs of cerebral hæmorrhage, from which he died in two days. He was well formed, had a beard, full-sized penis, and pubic hair. He was married, and it was stated that his wife had two children.

See *Medical Post-Mortem Register*, vol. xix. p. 275.

See also *Transactions of the Pathological Society*, vol. xlv. p. 102.

Sections of the testis, prostate, and uterus are preserved in Series lv. Nos. 542b, 562, and 593 respectively.

- 3671c. Some of the white granular material, weighing about fifty grains, which was obtained from the interior of the vagina of the preceding specimen, No. 3671b.

ANATOMICAL AND PHYSIOLOGICAL CATALOGUE.

SERIES VIII.—THE OSSEOUS SYSTEM.

- 304a. A Left Scapula, still showing the line of union between certain of the epiphyses (viz., that for the coracoid process, the tip of the acromion, and the glenoid cavity) and the body of the bone.

Presented by H. Weekes, Esq.

GROUP III.—MAMMALIA.

CLASS III. MONODELPHIA.

- 479a. The disarticulated bones of the skull of a young Sheep (*Ovis Aries*).

The bones were found in their present condition on the top of Great Gable, Cumberland.

Presented by H. B. Meakin, Esq.

SERIES XII.

THE ORGANS OF DEGLUTITION.

- 685a. The Tongue, Salivary Glands, and Larynx of a Duck-Mole (*Ornithorhynchus Paradoxus*). The tongue is of a peculiar shape, and consists of two portions, the anterior, which is long and narrow, and the posterior, which is short, much broader, and nearly circular; on the front and raised margin of the posterior portion are two short blunted teeth.

Each salivary gland opens on to the floor of the mouth by means of a duct more than an inch in length.

This Specimen, together with Nos. 903a and 1177b (*Anat. and Phys. Cat.*) were dissected by E. P. Paton, M.D., from a duck-billed platypus obtained in the Macdonald River, New South Wales, by L. Lloyd Allen, Esq., and presented by him to the Museum.

SERIES XXI.

ORGANS OF RESPIRATION.

903a. The Heart and Lungs of a Duck-Mole (*Ornithorhynchus Paradoxus*); there is an unusually high bifurcation of the trachea.

See also Nos. 685a and 1177b (*Anat. and Phys. Cat.*).

SERIES XXIII.

THE BRAIN AND SPINAL CORD.

929b. A Spinal Cord with its Membranes, together with the Medulla Oblongata, from which the specimen is suspended. The dura mater has been laid open in the middle line in front. The arachnoid, ligamenta dentata, the anterior roots, the cauda equina, and filum terminale are all well seen.

945a. The Brain of a Horse.

Presented by Henry Power, Esq.

SERIES XXXI.

ORGANS OF GENERATION IN THE FEMALE IN AN UNIMPREGNATED CONDITION.

1177b. The Rectum and Urino-Generative Organs of a female Duck-Mole (*Ornithorhynchus Paradoxus*). Inside the sphincter ani is a dilated pouch forming the common cloaca, into which the rectum and vagina open. The vagina is a thin membranous tube nearly two inches long, with five openings at its proximal end, a median one for the urinary bladder, and two lateral pairs, one of them belonging to the Fallopian tubes, the other to the ureters. Into these latter black bristles have been passed. As in birds, the right ovary and duct are smaller than the left.

See also Specimens No. 685a and 903a (*Anat. and Phys. Cat.*).

SERIES XXXVI.

INVERTEBRATA.

SUB-KINGDOM V.—MOLLUSCA.

CLASS III.—CEPHALOPODA.

A. TETRABRANCHIATA.

- 1632a. A Pearly Nautilus (*Nautilus Pompilius*) in its Shell. A portion of the shell has been removed to show the septa which separate the chambers.

Obtained by purchase.

SERIES XXXVII.

CASTS AND MODELS.

CLASS I.—NORMAL STRUCTURES.

HYO-EPIGLOTTIDEAN MUSCLES.

- 5a. A Wax Model of the Hyo-Epiglottidean Muscles. These, as described by John Macintyre, M.B., of Glasgow, are four in number, two median and two lateral. The first two—the median—are each seven-eighths of an inch in length, and appear as slender, flattened bands arising from the posterior surface of the body of the hyoid bone near the middle line. Passing backwards and slightly downwards, they are inserted into the anterior surface of the base of the epiglottis, where they spread out a little so as to touch the lateral pair at their insertion. The latter rise half an inch external to the former, from the great cornua of the hyoid bone and thyro-hyoid membrane, measure one inch in length, and are flattened from side to side. Passing backwards, inwards, and slightly downwards, they are inserted by an expansion of the tendon into the anterior surface of the epiglottis near the preceding pair. The muscles lie in a mass of adipose tissue, covered with the mucous membrane passing between the tongue and the epiglottis.

Presented by H. T. Butlin, Esq.

CLASS II.—MALFORMATIONS.

MICROCEPHALUS.

- 56a. Cast of the head of a child aged one month, the subject of congenital Hydrocephalus and Proptosis.

One half of the head is preserved in the Teratological Series, No. 3426a, and a drawing, made a few hours after the birth, in Series lvii. No. 1331, to which refer.

- 70f. Cast of the left hand of a child in which there is a congenital absence of the greater part of the index finger, with fusion of the middle, ring, and little fingers.
- 70g. Casts of the hands of a man: in each hand the middle and ring fingers are united throughout their whole length.

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J. S. SLOANE.

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Warden—Dr. SHORE.

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Further information respecting Scholarships, Pupils' Appointments, and other details, may be obtained from Dr. SHORE, and at the Museum and Library.

ST. BARTHOLOMEW'S HOSPITAL REPORTS.

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STATISTICAL TABLES

OF THE

Patients under Treatment

IN THE WARDS OF

ST. BARTHOLOMEW'S HOSPITAL

DURING 1893.

BY

THE MEDICAL REGISTRARS,

J. A. ORMEROD, M.D. (OXON.), F.R.C.P., AND W. P. HERRINGHAM, M.D. (OXON.), F.R.C.P.

AND

THE SURGICAL REGISTRAR,

JAMES BERRY, B.S. (LOND.), F.R.C.S.



London:

PRINTED BY CHARLES SKIPPER AND EAST,

49, GREAT TOWER STREET, E.C.

1894.

P R E F A C E.

The Classification of Diseases in the Medical Tables is that adopted by the College of Physicians in their Nomenclature of Diseases.

ST. BARTHOLOMEW'S HOSPITAL.

1893.

Number of Beds in	Medical Wards	...	...	...	...	...	...	206
"	"	"	Wards for Diseases of Women	...	...	...	...	20
"	"	"	Surgical Wards	...	...	...	...	362
"	"	"	Ophthalmic Wards	...	...	...	...	25
"	"	"	Unassigned	...	...	...	...	41
								<u>654</u>

GENERAL STATEMENT OF THE PATIENTS UNDER TREATMENT DURING THE YEAR 1893.

Patients remaining in January 1st, 1893 :—

Medical	174	} ... 381
Surgical	207	

Admitted during the year 1893 :—

Medical	2,523	} ... 6,855
Surgical	4,332	

... 7,236

Discharged :—

Medical	1,978	} ... 5,964
Surgical	3,986	

Died —

Medical	537	} ... 770
Surgical	233	

... 7,236

Remaining in January 1st, 1894 :—

Medical	182	} ... 502
Surgical	320	

Patients brought in Dead (or dying in the Surgery) ... 44

OCCUPATIONS OF MALE PATIENTS.

Accountant 1	Case makers 5	Farmers 4
Agents 4	Cattle dealer 1	Farriers 5
Apprentices 2	Cellarmen 3	Firemen 3
Architects 2	Chair makers... .. 7	Fishmongers 6
Artists... .. 2	Chapel keeper 1	Fish curer 1
Asylum attendants 2	Cheesemonger 1	Footmen 2
Auctioneers 2	Chemist 1	Foremen 4
	Chimney sweeps 6	Football maker 1
	Cigar makers... .. 3	Foundryman 1
	Clerks 76	Frame makers 2
	Cloth cutter 1	French-polishers 7
Bailiffs 2	Clothier 1	Fruiters 2
Bakers 15	Coachmakers... .. 4	Furrier 1
Barbers 3	Coachmen 5	
Barge builder... .. 1	Coal trimmer... .. 1	
Bargees 4	Coffee-house keepers 3	
Barmen 10	Collar cutter 1	
Barrister 1	Collier 1	Gardeners 20
Basket makers 2	Comedians 2	Gas fitters 4
Billiard markers 2	Commercial travellers 12	Gas stoker 1
Bill posters 2	Compositors 16	Gas workers 2
Blacksmiths 13	Cooks 11	Gilders 2
Blind makers... .. 2	Coopers 5	Glass workers 6
Boiler makers 3	Contractor 1	Greengrocers... .. 2
Bookbinders 19	Coppersmiths... .. 3	Grocers 14
Book-maker 1	Copyist 1	Grooms 8
Boot finisher 1	Cordite maker 1	Guards 2
Boot and Shoe makers 31	Cordwainer 1	Gymnast 1
Bonnet makers 3	Cork cutter 1	
Bottle washers 2	Costermongers 7	
Box makers 6	Cotton winders 2	
Brass workers 8		
Brewers 3		
Bricklayers 20		
Bronzers 2	Dairyman 1	Hairdressers 3
Brush makers 3	Dealers 12	Hammermen 4
Builders 10	Decorators 4	Harness makers 2
Butchers 32	Disinfectors 1	Hatters 4
Butler 1	Divers... .. 2	Hawkers 19
	Drapers 4	Horse keepers 17
	Draymen 3	Hospital attendants 2
	Drivers 35	
	Drovers 2	
	Drysalter 1	
	Dustmen 4	
	Dyers 2	
Cabinet makers 14		
Cabmen 11	Engine drivers 5	Ice-cream maker 1
Canvasser 1	Engineers 27	India-rubber worker... .. 1
Card makers 2	Engine fitters 2	Ink makers 3
Caretakers 4	Engravers 6	Ink bottler 1
Carmen 80	Errand boys 14	Inspectors 4
Carpenters 26		Instrument makers 3
Carriage cleaner 1		Invoice checker 1
Carriers 5		Iron workers 8
Cartridge makers 2		Ironmongers 2
Carvers 2		

Japanners	2	Picture-frame maker ...	1	Stall keeper	1
Jewellers	5	Pie maker	1	Stationers	4
Joiners	5	Pipe mounter	1	Stencil maker	1
		Plane maker	1	Stereotypers	2
		Plasterer	1	Stevedores	6
Kitchenman	1	Platelayers	7	Steward	1
		Plate polisher	1	Stick makers	4
		Plate washer	1	Stokers	9
Labourers	320	Plumbers	9	Stone breakers	3
Lamplighters	4	Pocket-book makers ...	2	Storekeeper	1
Lamptrimmer	1	Policemen	6	Students	12
Laundrymen	6	Polishers	10	Surgeons	6
Lead workers	4	Porters	117	Sweeper	1
Leather workers	9	Postmen	11	Sweeps	2
Lift attendants	2	Potters	2		
Lithographer	1	Poulterers	2		
Locksmith	1	Pressers	2		
		Printers	51	Tailors	23
		Publicans	6	Tanner	1
		Pugilist	1	Tea cooper	1
				Telegraphists	3
Machinists	5			Tennis-ball maker ...	1
Managers	2	Reader	1	Tent maker	1
Map mounter	1	Relieving officer	1	Thermometer makers ..	2
Masons	8	Ring maker	1	Ticket collectors	2
Mattress makers	4	Rule makers	2	Ticket maker	1
Mat weaver	1	Ruler	1	Tie cutters	2
Mechanic	1			Timekeeper	1
Merchants	3	Sack mender	1	Tinker	1
Messengers	13	Saddlers	2	Tin workers	7
Metal workers	5	Sailors	28	Tipstaff	1
Millers	2	Sail maker	1	Tobacconists	3
Miners	3	Salesmen	3	Tram conductors	3
Ministers	2	Sawyers	11	Travellers	5
Mosaicist	1	Scalemaker	1	Turners	2
Musicians	7	Scavengers	2	Tutor	1
		School boys	312	Type founders	10
		School master	1		
		Screw maker	1	Umbrella makers	3
		Scrubber	1	Upholsterers	6
		Secretary	1		
		Servants	3	Valet	1
		Shell hardener	1	Van boys	1+
		Shepherd	1	Van men	9
		Ship builder	1		
Packers	22	Shoeblick	1	Waiters	13
Painters	41	Shop fitters	2	Warehousemen	23
Paper hanger	1	Shopmen	17	Warrant officer	1
Paper workers	6	Silk cutter	1	Watchmakers	6
Pastrycooks	2	Signalmen	3	Watchmen	3
Pauper	1	Silversmiths	3	Weaver	1
Pavior	1	Skinner	2	Wheelwrights	2
Pedlar	1	Slaughtermen	2	Whip makers	3
Pensioners	2	Soapmaker	1	Window cleaners	2
Perfumer	1	Soldiers	9	Wire maker	1
Photographer	1	Sponge merchant	1	Wire workers	5
Pianoforte makers	3	Spring maker	1	Wood cutters	8
Piano tuner	1			Wool worker	1

MEDICAL REPORT.

PREFACE TO THE APPENDIX (MEDICAL TABLES).

In place of the partial and fragmentary Indices which were formerly appended to each Table, a complete Index of Medical Cases has been added.

References to the clinical reports are made as follows:—The name of a ward indicates the ward-book for the year (1893), while the Arabic numeral following indicates the number therein of the report in question.

Owing to the resignation of Dr. Andrew the wards have not all been continuously occupied by the same physician throughout the year, but in binding and indexing the notes the name of the ward occupied by each physician after the alteration has been adhered to. Thus (with the exception of Radcliffe and Casualty, which are indexed under those names) :

All Dr. Church's cases are indexed under Mark (males), and Faith (females)

Dr. Gee's	„	„	Luke	„	Hope	„
Sir Dyce Duckworth's	„	„	John	„	Elizabeth	„
Dr. Hensley's and Dr. Andrew's	„	„	Matthew	„	Mary	„

The ward-books (bound volumes of clinical reports) and the completed post-mortem registers are kept in the Library.

TABLE I. (continued).

[illegible]

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DISEASE.	Total.	Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
		Died.		Died.		Died.		Died.		Died.		Died.		Died.		Died.		Died.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
LOCAL DISEASES.																			
DISEASES OF THE NERVOUS SYSTEM.																			
<i>General.</i>																			
Imbecility ..	4	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Dementia ..	3	..	..	..	..	..	..	1	..	..	..	1	..	..	..	1	..	..	..
Mania ..	3	2	1	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..
Melancholia ..	1	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
General Paralysis ..	3	3	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
Dipsomania ..	1	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Trismus ..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Chorea ..	39	11	28	..	..	4	10	1	5	..	1	3	..	..	..	..	..	..	..
Epilepsy ..	16	12	4	..	..	3	..	..	..	2	..	1	..	2	2	..	1	..	..
Convulsions ..	10	6	2	1	1	1	1	1	..	1	1	..	1	..	2	1	..	..	..
Hysteria ..	7	1	6	..	..	1	1	..	1	..	4	..	..	..	..	..	..	..	..
Paralysis of Nature ..	7	3	3	1	..	..	1	1	..	1	..	1	..	2	1	..	..	..	..
Tremor ..	2	2	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
Nervous Debility ..	3	1	2	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
<i>Cranial.</i>																			
Meningitis ..	5	..	2	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Cerebro-Spinal ..	4	2	1	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Tubercular ..	18	..	9	9	6	2	..	1	..	..	2	..	..	..	..	..	..	..	..
Purulent ..	6	..	3	3	1	..	..	..	..	1	1	..	..	..	1	..	..	..	..

TABLE I. (continued).

DISEASE.	Total.		Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
DISEASES OF THE NERVOUS SYSTEM (continued).																								
Ascending Paralysis	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Disseminated Sclerosis	...	3	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Syringo-myelia	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Peripheral.																								
Neuritis	...	11	6	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheritic Paralysis	...	7	3	1	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sciatica	...	8	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Neuralgia	...	5	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Muscular Atrophy	...	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Progressive	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Myalgia	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	...	267	121	87	39	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE I. (continued).

[illegible]

TABLE I. (continued.)

DISEASE.	Total.		Discharged.		Died.	Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.		
						Died.		Discharged.		Died.		Discharged.		Died.		Discharged.		Died.		Discharged.				
	M.	F.	M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
DISEASES OF THE DIGESTIVE SYSTEM.																								
Stomatitis Herpetiformis ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tonsillitis ...	34	20	...	...	...	...	...	...	1	...	1	2	...	4	4	...	6	12	...	1	...	...
Tumour of Palate ...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dysphagia ...	4	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Growth of Oesophagus ...	5	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gastr-odynia ...	6	2	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
Dyspepsia ...	6	1	...	...	...	...	...	...	...	...	...	...	...	4	1	...	...	...	...	...	...	...
Vomiting ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gastritis ...	8	3	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Dilated Stomach ...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hæmatemesis ...	10	2	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...
Ulcer... ..	20	18	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...
Cancer ...	10	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Enteritis ...	11	9	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Tubercular ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ulcerative Colitis ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Malignant Disease of Colon ...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Foreign body in Rectum ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Intestinal Obstruction ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Intus-susception ...	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Perityphlitis ...	23	19	3		
Peritonitis ...	8	4		
Purulent ...	9		
Chronic & Tubercular ...	12	5		

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TABLE I. (continued).

DISEASE.	Total.		Discharged.		Died.	Under 5.	— 10.	— 15.	— 20.	— 30.	— 40.	— 50.	— 60.	Over 60.
	M.	F.	M.	F.	M.	F.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.
DISEASES OF THE FE- MALE GENERATIVE SYSTEM.														
<i>Vulva</i> , Hæmatoma...	1	1	...	...	...	...	...	...	1	...	...	...	...	...
Ulceration ...	1	1	...	...	...	...	...	...	...	1	...	...	...	...
Fatty Tumour ...	1	1	...	...	...	...	...	...	...	...	1	...	...	...
Epithelioma ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Ruptured Perinæum	8	...	...	...	...	...	...	...	...	4	...	1	...	...
<i>Urethra</i> , Prolapsed	1	1	...	...	...	...	...	...	...	...	...	...	...	1
Caruncle...	9	...	...	...	...	...	...	...	...	2	...	...	5	...
<i>Vagina</i> , Vaginitis ...	2	...	...	...	...	...	...	...	2	...	...	...	...	...
Fibrous Tumour	1	1	...	...	...	...	...	...	...	1	...	...	...	...
Cyst ...	1	1	...	...	...	...	...	...	...	1	...	1	...	...
Cystocele	2	...	...	...	...	...	...	...	...	1	...	...	1	...
Fistula, vesico-v	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Fistula, recto-v...	1	1	...	...	...	...	...	...	...	1	...	...	...	...
<i>Cervix</i> , Hypertrophy	1	1	...	...	...	...	...	...	...	1	...	...	...	...
Elongation ...	1	1	...	...	...	...	...	...	...	...	1	...	...	...
Catarrh ...	3	3	...	...	...	...	...	...	2	...	1	...	...	...
Erosion ...	4	4	...	...	...	...	...	...	...	...	2	...	1	...
Carcinoma	9	9	...	...	...	...	...	...	...	1	4	...	...	...
Epithelioma ...	2	2	...	...	...	...	...	...	...	1	...	1	...	...

DISEASE.	Total.	Discharged.		Died.	Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.		
		M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
																							Discharged.
DISEASES OF THE FEMALE GENERATIVE SYSTEM (continued).																							
Uterus, Prolapsus	7	..	7	..	..	..	..	..	..	..	..	..	1	..	3	..	2	..	..	..	..	1
Anteflexion	1	..	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Retroversion	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Inversion	1	..	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Endo-metritis	2	..	2	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Peri-metritis	26	..	26	..	..	..	..	..	..	..	..	..	15	..	6	..	1	..	..	..	..	..
Perimetritic abscess	3	..	3	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..
Polypus	10	..	10	..	..	..	..	..	..	..	..	..	..	..	3	..	6	..	1	..	..	..
Fibroid	12	..	10	..	..	..	..	..	..	..	..	..	..	..	3	..	6	..	1	..	..	..
Tumour	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Carcinoma	11	..	9	..	..	..	..	..	..	..	..	..	1	..	..	..	6	..	2	..	..	..
Epithelioma	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Parametric abscess	11	..	11	7	
Hæmorrhage	15	..	15	6	..	4	..	2	..	1	
Appendages, inflamed	1	..	1	1	

TABLE I. (continued).

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ABSTRACT OF TABLE I.

30

DISEASES.	Total Number of Cases completed during the Year 1893.	Number of Cases discharged.		Deaths.	Remaining in the Hospital at the end of the Year 1893.
		M.	F.		
GENERAL DISEASES, A ...	279	103	86	M. 56	F. 34
Do. B ...	315	124	168	14	9
LOCAL DISEASES—					
Diseases of the Nervous System ...	267	121	87	39	20
" " Circulatory System ...	213	91	54	32	26
" " Respiratory System ...	684	371	155	112	46
" " Digestive System ...	316	124	129	33	30
" " Urinary System ...	118	47	42	25	14
" " Female Generative System ...	214	...	203	...	11
" " connected with Pregnancy ...	58	...	52	...	6
" " of the Cutaneous System ...	24	9	13	...	2
CONDITIONS NOT NECESSARILY ASSOCIATED WITH GENERAL OR LOCAL DISEASES—					
POISONS ...	27	21	4	2	...
	2,515	1,011	993	313	198
		2,004		511	
		2,515		183	

I N D E X

TO THE DISEASES AND CHIEF SYMPTOMS OF PATIENTS DISCHARGED
FROM THE MEDICAL WARDS DURING THE YEAR 1893.

N.B.—The mark (*) signifies that a post-mortem examination was made. The reference to the post-mortem notes, together with an abstract of these, is in each case added to the Ward notes.

ABDOMINAL ABSCESS—*see* Abscess.

Tumour—*see* Cancer, Kidney, Liver, Ovary, Spleen, Tumour, Uterus.

ABORTION—*Hope* 3* ; *Martha* 12, 182, 184, 191.

Incomplete—*Martha* 1, 17*, 43, 69, 88, 104, 105, 163, 178, 237, 245, 251, 253;
Casualty 3, 10, 11.

Sequelæ of—*Martha* 38, 39, 59, 84, 137, 200.

ABSCCESS—

Abdominal—*Matthew* 22, 255.

Sub-Diaphragmatic—*John* 140, 153* ; *Elizabeth* ? 228, 259 ; *Mary* ? 76.

Various—*Mark* 111 ; *Luke* 180, 196* ; *Matthew* 261 ; *Faith* 21 ; *Hope* 138 ;
Elizabeth 238 ; *Radeliffe* 31* ; *Casualty* 1.

See Cerebral, Lung, Liver, Perityphlitic, Parametric, Perimetric.

ACTINO-MYCOSIS—*Mark* 240*.

ADDISON'S DISEASE—*Luke* 90*.

See Supra-renals.

AGUE—*Mark* 36 ; *Luke* 42, 104, 164, 276 ; *Matthew* 67, 267.

ALCOHOLISM, Acute—*Mark* 148 ; *Luke* 100, 177, 179 ; *John* 64*, 192* ; *Matthew* 13, 80*, 99.

AMYLOID DISEASE—*John* 67, ? 187 ; *Matthew* ? 156, ? 186 ; *Elizabeth* 157.

ANÆMIA—*Mark* 263 ; *Luke* 108* ; *Faith* 40, 138, 195 ; *Hope* 91, 102, 131, 141, 166, 189, 211 ; *Elizabeth* 24, 29, 30, 31, 34, 35, 43, 49, 58, 67, 71, 74, 87, 100, 155 ; *Mary* 74, 78, 183, 197, 205, 210, 213.

Pernicious—*John* 28* ; *Mary* 40*.

Splenic, of Infants—*Hope* 189.

ANEURYSM, Aortic—*Mark* 5, 43, 133, 257* ; *Luke* 98, 294*, 316 ; *John* 45, 165 ;
Matthew 124*.

ANGINA PECTORIS—*Mark* 30* ; *John* 18*, 72 ; *Matthew* 3, 276 ; *Mary* 96.

AGRAPHIA }
APHASIA } *See* Speech.
APHONIA }

APPENDAGES (Uterine), Inflamed—*Hope* 182* ; *Mary* 139* ; *Martha* 8, 242 ;
Casualty 15*.

ARTHRITIS—*John* 91 ; *Hope* 29 ; *Mary* 60.

Septicæmic—*Hope* 49 ; *Casualty* 19.

Syphilitic—*Mark* 200.

ASCITES—*Mark* 2, 21, 51, 58, 101, 196, 221, 228, 245* ; *Luke* 107, 114, 154*, 250, 285 ; *John* 32*, 36, 98, 156, 163 ; *Matthew* 28*, 32, 41*, 59*, 109*, 287 ; *Faith* 26*, 58, 98, 105, 141 ; *Hope* 2*, 15, 22, 44, 118, 162, 179 ; *Elizabeth* 20, 112, 163, 220*, 236 ; *Mary* 86.

Chylous—*Luke* 23*.

ASTHMA—*Mark* 243 ; *John* 78.

ATAXIA—*Mark* 11, 99*, 178, 182 ; *Luke* 119, 209, 277, 281, 289, 290 ; *John* 108, 162 ; *Hope* 33 ; *Mary* 10.

Hereditary, of Friedreich—*Hope* 206, 207.

See Paraplegia-ataxic, Tabes Dorsalis.

ATHETOSIS—*Matthew* ? 175.

BROMIDE RASH—*Luke* 177.

BRONCHI-ECTASIS—*Mark* 238 ; *John* 23*, ? 113, 142 ; *Faith* ? 20, 25* ; *Hope* 94 ; *Elizabeth* 109*.

BRONCHITIS—*Mark* 7, 16, 21, 22, 69*, 91, 126, 191, 196*, 267, 284, 297 ; *Luke* 22, 48, 59, 63, 74, 76, 113*, 118, 140, 154*, 163, 170*, 184, 193, 204, 246, 247, 304 ; *John* 26, 60, 61, 65, 73*, 83*, 97*, 113, 114, 176, 192*, 200 ; *Matthew* 13, 19, 21, 28*, 34, 41*, 64, 79*, 84, 87, 92, 100, 141*, 170*, 188, 192, 235, 236, 290 ; *Faith* 7*, 14, 31, 49, 60, 67, 92, 124, 136*, 189 ; *Hope* 21, 25, 32*, 37*, 96, 98, 113, 122*, 160, 170, 198, 213, 222 ; *Elizabeth* 18, 22, 45, 57, 97, 109*, 124, 166*, 225, 243, 263, 268 ; *Mary* 36, 41, 69, 80, 81, 91, 146, 184, 194, 203, 206.

BRONCHO-PNEUMONIA—See Pneumonia, Catarrhal.

CALCULUS—

Biliary—*Luke* 296 ; *Matthew* 246 ; *Elizabeth* 242 ; *Mary* 182, ? 200.

Renal—*Mark* 55, 193 ; *Matthew* 82, 280 ; *Hope* 181 ; *Elizabeth* 189, 248 ; *Mary* 47.

CANCER (including all Malignant Tumours)—

In Abdomen—*Martha* 82, 100, 149.

Of Abdominal Wall—*Mark* 227.

Of Bones—*Faith* 53*.

Of Brain—see Cerebral.

Of Cæcum—*Elizabeth* 38*.

Of Colon—*Luke* 66* ; *Faith* 8* ; *Elizabeth* 219*.

Of Kidney—*Mark* 287* ; *Matthew* 204*, 299* ; *Hope* 171* ; *Mary* 85 ; *Martha* 258.

Of Liver—*Mark* 287* ; *John* 201* ; *Matthew* 109* ; *Faith* 185* ; *Hope* 171*, 228* ; *Elizabeth* 125 ; *Mary* 95*.

Of Lung and Pleura—*Mark* 4* ; *John* 201* ; *Matthew* 204*, 299* ; *Hope* 171*.

Of Mediastinum—*Mark* ? 105 ; *Luke* 23*.

Of Oesophagus—*Matthew* 1*, 89*, 285*.—See also Dysphagia.

Of Omentum—*Mark* 204* ; *Faith* 185* ; *Mary* 168.

Of Palate—*Elizabeth* 186.

Of Pancreas—*Mark* 239* ; *Luke* 24* ; *John* 201* ; *Hope* 105, 164*, 228* ; *Mary* 95*.

Of Peritoneum—*John* 36 ; *Martha* 188.

Of Stomach—*Mark* 34, 171* ; *Luke* ? 306 ; *John* 69*, 85* ; *Matthew* 212* ; *Hope* 145* ; *Elizabeth* 65*, 125 ; *Mary* 168, 207, 215.

Of Supra-Renals—*Mark* 4*, 287* ; *Hope* 228*.

Of Uterine Cervix—*Martha* 28, 68, 106, 118, 125, 127, 167, 170, 175, 180, 238.

Of Uterus—*Martha* 7, 19, 23, 24, 26, 26A, 117, 201, 212*, ? 220, ? 232, 252.

Of Vulva—*Martha* 192*.

- CARBUNCLE—*Faith* 78.
- CARIES OF VERTEBRÆ—*Mark* 42, 280* ; *Luke* ? 65.
- CEREBELLAR HÆMORRHAGE—*Luke* 133*.
- CEREBELLAR ABSCESS—*Luke* 309*.
- CEREBRAL ABSCESS—*Hope* 216* ; *Mary* 65* , 139*.
- CEREBRAL HÆMORRHAGE—*Mark* 84* , 189* , 289* ; *Luke* 6* , 207* ; *John* 125* ; *Matthew* 29* , 140* ; *Hope* 12* , 73* ; *Elizabeth* 141*.
- CEREBRAL EMBOLISM—*Luke* 308 ; *Faith* 33 ; *Hope* 73* ; *Mary* 50*.
See also Hemiplegia.
- CEREBRAL TUMOUR—*Mark* ? 90 ; *Luke* 82 , 89 , 153* ; *John* 92* , ? 190 ; *Matthew* ? 227 , ? 268 ; *Faith* 120 ; *Elizabeth* 117* ; *Mary* 195.
- CHOLERA NOSTRAS—*Luke* 213 ; *Matthew* 153 , 239 ; *Radeliffe* 77 , 78 , 81 , 82 , 83 , 85.
- CHOREA—*Mark* 95 , 228 , 266 ; *Luke* 31 , 73 , 96 , 302 , 303 ; *John* 49 ; *Matthew* 86 , 148 , 224 ; *Faith* 32 , 68 , 94 , 103 , 156 , 199 , 202 ; *Hope* 10 , 57 , 58 , 67 , 72 , 75 , 116 , 176 ; *Elizabeth* 27 , 41 , 55 , 62 , 105 , 110 , 208 , 210 , 234 , 266 ; *Mary* 8 , 21 , 64 , 71 , 108 , 154 , 196.
- CHOROIDITIS—*Luke* 212 ; *Matthew* 101.
- CIRRHOSIS—*See* Liver, Lung.
- COCCYG-ODYNIA—*Luke* 270.
- COLIC—*Mark* 28 , 149 ; *Luke* 80 , 176 ; *Matthew* 293 ; *Elizabeth* 86.
See Lead ; for biliary, renal Colic—*see* Calculus.
- COLITIS, Ulcerative—*Luke* ? 187 ; *Faith* ? 162 , 177* ; *Mary* 166*.
- CONSTIPATION—*Mark* 28 ; *Luke* 200 ; *Matthew* 196 ; *Faith* 173 ; *Hope* 202 ; *Elizabeth* 60 , 78 ; *Mary* 157.
- CONVULSIONS—*Mark* 6 , 18 , 19 , 196 ; *Luke* 38 , 116 , 134* ; *Matthew* 133* , 187 ; *Faith* 39* , 38 , 41 , 52 , 57 , 79 , 97 , 124 , 141 ; *Hope* 73* , 192 , 210 , 217 ; *Elizabeth* 108 , 148 ; *Mary* 179.
See Epilepsy, Epileptiform, Puerperal.
- CRETINISM—*Hope* 56 ; *Elizabeth* 213.
- CRISES GASTRIQUES—*Luke* 281 ; *Mary* 10.
- CROUP—*See* Diphtheria, Laryngismus, Laryngitis.
- CYNANCHE CELLULARIS—*Luke* 321* ; *Matthew* 173.
- CYSTITIS—*Mark* 1 , 7 , 93* ; *Luke* 210 ; *John* 63 ; *Matthew* (tubercular) 277* ; *Faith* 30 ; *Mary* ? 208 ; *Martha* 120 , 224.
See Pyuria.
- CYSTOCELE—*Martha* 87 , 119.
- DEMENTIA—*Mark* 160 , 285 ; *Luke* 5 , 27 , 165 , 263 ; *John* 87 ; *Matthew* 101 , 187 , 228 ; *Faith* 147 , 148 , 204 ; *Martha* 90.
E potu—*Luke* 290 ; *Hope* 30*.
Paralytica—*See* Paralysis, general.
- DERMATITIS HERPETIFORMIS—*Elizabeth* 81.
- DIABETES—
Insipidus—*Mark* 73.
See also Polyuria.
Mellitus—*Mark* 39 , 237 , 294 ; *Luke* 10* , 44 , 55 , 103 , 149 ; *John* 18* , 20 , 29 , 178 ; *Matthew* 2 , 52 , 61 ; *Faith* 43 , 197 ; *Hope* 63 ; *Elizabeth* 89 ; *Mary* 11 , 59 , 116* ; *Casualty* 21.
- DIABETIC GANGRENE—*Casualty* 21.
- DIARRHŒA—*Mark* 25 , 106 , 216 , 229 , 242 ; *Luke* 49 , 95 , 126 , 159 , 168 , 230 ; *John* 90* ; *Matthew* 26 , 36 , 191 , 206 , 222 ; *Faith* 7* , 42 , 79 , 112 , 143 , 152 , 166 , 170 ; *Hope* 134 ; *Elizabeth* 90 , 139 , 148 , 166* , 181 ; *Mary* 131 , 176.
- DIPSO-MANIA—*Matthew* 51.

- DIPHTHERIA—*Mark* 112 ; *John* 55 ; *Matthew* 259* ; *Faith* 149 ; *Elizabeth* ? 3* ; *Mary* 167 ; *Radcliffe* 1, 3, 4, 6, 7*, 8*, 9*, 10, 12, 13, 15-18*, 19-21*, 22, 23*-25*, 26*, 27, 30*, 31*-34*, 35-41*, 42*-45*, 46-48*, 49, 50*-53*, 54*, ? 55, 56-61*, 62-70*, 71-74*, 75*, 76, 79, 84, 86-88*, 89*-92*, 93*, 94*-97*, 98-100*, 101.
- DUODENAL ULCER—151*.
- DYSENTERY—*Mark* 36, 218 ; *Luke* 42, ? 187 ; *Hope* 124.
- DYSMENORRHOEA—*Elizabeth* 14 ; *Martha* 11, 47, 79, 134, 150, 165, 250.
- DYSPAREUNIA—*Martha* 47.
- DYSPEPSIA—*see* Gastritis.
- DYSPHAGIA—*Mark* 1, 104, 181, 260 ; *Luke* 34, 161 ; *Matthew* 128.
- ECZEMA—*Mark* 223 (palmar), *John* 29, *Elizabeth* 26, 32, 74, 89, 127.
- EMPHYSEMA—*Mark* 16, 35*, 63*, 73, 119*, 191, 197, 198, 222, 297 ; *Luke* 22, 25, 61, 100*, 154*, 204 ; *John* 23*, 26, 44, 65, 73*, 79*, 83*, 97*, 104, 113, 171*, 174, 176, 200, 204* ; *Matthew* 34, 56, 64, 83*, 87, 98, 141*, 157*, 160*, 188, 192, 218, 236 ; *Faith* 3*, 31*, 126*, 189 ; *Hope* 16*, 21, 32* ; *Elizabeth* 57, 97, 109*, 268 ; *Mary* 16, 24*.
- Surgical—*John* 55.
- EMPHYEMA—*Mark* 102, 166, ? 141, 202*, 233, ? 280*, 293 ; *Luke* 20, 167*, 215, 222, 266, 279, 320, 321* ; *John* 39, 50, 120, 131, 136, 149, 179 ; *Matthew* 38, 41*, 144, 154*, 298 ; *Faith* 19, 69, 144, 146 ; *Hope* 139, 194 ; *Elizabeth* 21, 21A, 114, 166* ; *Mary* 76, 125, 151, 171.
- See also* Pyo-pneumo-thorax.
- ENDO-CARDITIS—
Simple—*See* Heart Disease.
Ulcerative—*Mark* 150*, 202*, 206* ; *Luke* 239* ; *John* ? 177* ; *Hope* 73* ; *Elizabeth* 160A*, 195*.
- ENDO-METRITIS—*Martha* 39, 174.
- EPILEPSY—*Mark* 27, 177, 285 ; *Luke* 87 (local). 92, 203, 235, 242 ; *John* 6, 44, 202 ; *Matthew* 73, 263 ; *Faith* 78, 99 ; *Hope*, 81, 129* ; *Elizabeth* 34, 68 ; *Mary* 111, 218.
- EPILEPTIFORM ATTACK—*Luke* 5, 151, 204, 208.
See also Convulsions.
- EPISTAXIS—*Mark* 196 ; *Luke* 114 ; *John* 53*, 204* ; *Elizabeth* 173.
- ERYSIPELAS—*Hope* 167, 167A, 205.
Of Face—*Casualty* 2, 22, 23, 24, 25, 26, 27, 28, 30.
- ERYTHEMA—*Mark* 196, 283 ; *Luke* 204 ; *John* 1, 21, 121 ; *Matthew* 25, 85, 302 ; *Faith* 17, 21, 127, 158, 171 ; *Radcliffe* 6.
Marginatum—*Elizabeth* ? 32.
Multiforme—*Luke* 229 ; *Elizabeth* 121, 178 ; *Mary* 118.
Nodosum—*Hope* 46, 144 ; *Mary* 191.
- EXOPHTHALMIC GOITRE—*Hope* 129*, ? 183, 190 ; *Elizabeth* 37, 51, 131, 147 ; *Mary* 72.
- EXOPHTHALMOS—*Elizabeth* 17.
- EXOSTOSIS, Multiple—*Faith* 165.
- FÆCAL IMPACTION—*Mark* 81 ; *Faith* ? 50.
- FAT IN URINE—*Matthew* 24.
- FISTULA—*Martha* 3 (recto-vaginal), 33 (vesico-vaginal).
- GANGRENE, Symmetrical.—*see* Raynaud's Disease.
- GASTRIC—*see* Stomach.
- GASTRITIS—*Luke* 243 ; *Faith* 135 ; *Hope* 34, 87, 93, 117 ; *Elizabeth* 217 ; *Elizabeth* 4, 70, 77 ; *Mary* 70.

- GASTR-ODYNIA—*Matthew* 187, 203; *Faith* 137; *Hope* 28, 64, 102, 103; *Elizabeth* 231; *Mary* 141, 210.
- GASTRO-ENTERITIS—*Luke* 213; *John* 15, 25; *Matthew* 117, 206; *Hope* 79, 136, 156; *Elizabeth* 159; *Mary* 143, 150.
- GLYCOSURIA—*Faith* 46; *Hope* 23.
- GOÏTRE—*Hope* 183.
- GOUT—*Mark* 8; *Luke* 94, 112, 114, 133*, 137, 174, 257, 323; *John* 11, 98, 100, 197; *Matthew* 28*, 34, 142, 166; *Elizabeth* 104, 165, 190.
- HÆMATEMESIS—*Mark* 45, 67; *Luke* 201; *John* 130; *Matthew* 20; *Faith* 89, 158, 164, 191; *Hope* 60, 91, 132, 150, 182*, 191, 199, 208; *Elizabeth* 167; *Mary* 110, 134.
- HÆMATURIA—*Faith* 157; *Elizabeth* 160A*; *Mary* 30, 61.
See also Calculus, Nephritis.
Paroxysmal—*Mark* 169.
- HÆMOPHILIA—*Luke* 127.
- HÆMOPTYSIS—*Mark* 47, 48, 78*, 108, 112, 132, 140*, 155, 251; *Luke* 72*, 206*; *John* 117, 189*, 204*; *Matthew* 1*, 90, 124*, 126, 178, 182*, 215, 254, 283, 301; *Hope* 2*, 73*; *Elizabeth* 103, 252*.
- HÆMORRHAGE—See Uterine.
- HEART DISEASE—*Mark* 155, 159; *John* 17.
Mitral—*Mark* 14, 41, 51, 66*, 78*, 82, 91, 95, ? 101, 106, 119*, 121, 122, 123, 124, 130, 151, 173, 197, 215, 222, 225, 228, 231, 244, 250, 265, 270, 276, 288*; *Luke* 2*, 3, 5, 7, 14, 23, 25, 26, 32, 54, 56, 63, 72*, 81, 132, 152, 163, 181, 206*, 218, 233, 249, 265, 273, 292, 307; *John* 1, 2, 12, 32*, 46, 49, 60, 86, 88, 102, 126, 128, 132, 134, 137, 138A, 139, 143, 144, 160, 169, 171*, 173, 177*, 181, 195; *Matthew* 3, 5, 8, ? 12, ? 13, 16, 25, 27, 32, 35, 39, 56, 64, 76, 85, 86, 119, 131, 147, 148, 161, 199, 213, 217*, 223, 232, 237, 240, 256*, 258, 265, 268, 273, 283, 295, 297; *Faith* 1, 9, 11, 13, 25*, 32, 33, 37, 44, 68, 77, 91, 94, 103, 110, 126*, 127, 147, 171*, 192, 195; *Hope* 2*, 3*, 6, 10, 19, 24, 48, 57, 59, 65, 71*, 76, 77, 80, 89, 114, 116, 153, ? 135, ? 146, 168, 172, 179, ? 184, 196, 204, 214; *Elizabeth* 1, 5, 17, 25, 27, 37, 41, 51, 55, 58, 60, 62, 97, 103, 110, 129, 130, 133, 134, 138, 151, ? 155, 157, 160, 171, 175*, 178, 188, 199, ? 203, 205, 207, 208, 210, 211, 214*, 227, 236, 237*, 240, 245, 266; *Mary* 6*, 8, 13*, 16, 20, 24*, 31, 49, 53, 92, 96, 100, 108, 114, 118*, 130, 149, ? 154, 159, 161, 190, 204*; *Casualty* 16.
Aortic—*Mark* 5, 30*, 47, 78*, 91, ? 97, 119*, 130, 134*, 135*, 190, 194, 288*; *Luke* 3, 5, 14, 25, 26, 54, 56, 63, 71, 72*, 111, 132, 170*, 218, 226, 239*, ? 240, 272, 292, 299, 300; *John* 18*, 59*, 72, 77, 86, 102, 132, 144, 149, 180, 193; *Matthew* 3, 16, 27, 28*, 32, 76, 85, ? 86, 107, 131, 137*, 199, 232, 240, 256*, 258, 265, 276, 295, 297, 301; *Faith* 9, 48*, 125, 147, 180; *Hope* 11, 71*; *Elizabeth* 40, 151, 227; *Mary* 96, 119, 204*; *Casualty* 16.
Congenital—*Luke* 204; *Faith* 181.
Hypertrophy—*Mark* 80, 189*, 196*, 289*; *Luke* 61*, 84*, 285*, 294*; *John* 4*, 129, 204*; *Elizabeth* 99*.
Dilatation—*Mark* 156*, 158, 196*, 197, 219, 226*; *Luke* 61*, 67, 84*, 154*, 285*, 291, 294*; *John* 73*, 118*, 171*; *Matthew* 59*, 98, 205; *Hope* 22, 51*; *Mary* 144*.
- HEMIPLEGIA—*Mark* 24, 49, 84*, 131; *Luke* 6, 124, 153*, 160, 203, 231, 241, 308, 323; *John* 7, 31, 166, 172, 184, 202; *Matthew* 60, 118, 127, 140*, 175, 187, 268; *Faith* 12, 33, 187; *Hope* 39, 73*; *Elizabeth* 19, 68, 117*; *Mary* 111, 195.
- HYDRAMNIOS—*Martha* 156.
- HYDROCEPHALUS—*Faith* 59, 22*.
Acute Internal—*Mary* 123*.
- HYDRO-NEPHROSIS—*Mark* 214, 261; *Hope* 180.

HYSTERIA—*Faith* 89, 173 ; *Hope* 50, 87, 130 ; *Mary* 7, 51.

Contraction of visual field in—*Hope* 50, 87, 130.

Contracture in—*Hope* 50.

Paralysis in—*Hope* 130.

IDIOCY—*Mark* 82, 248, 282 ; *Faith* 202 ; *Mary* 187.

INFLUENZA—*Mark* 44, 56, 97, 271, 283, 286 ; *Luke* 311 ; *John* ? 70 ; *Faith* ? 17, 23, 29 ; *Hope* 27, ? 52, 212 ; *Elizabeth* 39, 42, 239 ; *Mary* 44.

INTESTINE, infarction of—*Elizabeth* 160A.

See Gastro-enteritis, Obstruction, Perforation.

INTUS-SUSCEPTION—*Faith* 30, 182.

JAUNDICE—*Mark* 157, 230, 252 ; *Luke* 24, 190, 206* ; *John* 29, 36, 67 ; *Matthew* 32, 59*, 74, 80*, 81*, 129*, 246 ; *Faith* 58, 171 ; *Hope* 182*, 228* ; *Elizabeth* 220*, 241 ; *Mary* 28, 63, 83, 132, 182, 200.

KIDNEY—

Atrophy of—*John* 118*.

Infarction of—*Mark* 119*, 135* ; *Luke* 239* ; *John* 199* ; *Hope* 73* ; *Elizabeth* 160A*.

Movable—*Hope* 85 ; *Elizabeth* 127, 237* ; *Martha* 38.

Tubercular disease of—*Luke* 130*.

See also Cancer, Hydro-Nephrosis, Nephritis.

LABOUR—

Induced—*Martha* 36, 21, 72, 148.

Normal—*Martha* 176.

Obstructed—*Martha* 138*—see Pelvis, contracted.

Premature—*Martha* 85.

LARYNGISMUS STRIDULUS—*Mark* 98 ; *Luke* 146, 155, 278 ; *Matthew* 216, 247, 269 ; *Faith* 47 ; *Mary* 57.

LARYNGITIS—*Mark* 54, 66, 185, 208 ; *Luke* 33, 37, 155, 184, 245 ; *John* 16, 84 ; *Matthew* 184, 249 ; *Faith* 27, 102, 115, 184 ; *Hope* 92, 119, 121 ; *Elizabeth* 15, 28, 66 ; *Mary* 4, 15, 80, 90, 128, 184, 212.

Phlegmonous—see Cynanche.

Tubercular—*Luke* 12 ; *Matthew* 128.

LARYNX, Paralysis of—*Mark* 104 ; *Matthew* 124*.

LEAD—

Colic—*Mark* 164, 258 ; *Luke* 21, 66, 214 ; *Matthew* 77, 171.

Encephalopathy—*Luke* 21 ; *John* ? 74, ? 190.

Impregnation—*John* 11, 48, 71, 164, 197.

Paralysis—*Luke* 267 ; *John* 170 ; *Matthew* 77, 171.

LEUCOCYTHÆMIA—*John* 150, 190 ; *Matthew* 69*, 82 ; *Hope* 220.

LIVER—

Abscess of—*Mark* 293.

Cirrhosis of—*Mark* 21, 58, 156*, 221, 300 ; *Luke* ? 114, 170*, 175, 250, ? 306, ? 322* ; *John* 98, 130, 163 ; *Matthew* 41* ; *Faith* 26*, 58, 105, 191 ; *Hope* 118, 182* ; *Elizabeth* 20, 33, 220* ; *Mary* 83, 214.

Cancer of—see Cancer.

Enlargement of—*Mark* 51, 53, 80, 91, 105, 119*, 122, 123, 134*, 135*, 150*, 157, 158, 197, 228, 252, 256 ; *Luke* 28, 114 ; *John* 67, 95, 139, 150, 156, 169, 173 ; *Matthew* 21, 28*, 32, 69*, 166, 205, 283, 295 ; *Faith* 25*, 37, 48*, 49, 110, 127, 171 ; *Hope* 2*, 13, 22, 59, 118, 137, 168, 201 ; *Elizabeth* 2, 82, 99*, 155, 157, 171, 199, 205, 241 ; *Mary* 31, 91, 132, 200.

Hydatid Tumour of—*Elizabeth* 265 ; *Mary* 201.

Syphilitic disease of—*Matthew* 186.

LUNG—

Abscess of—*Mark* 96, ? 141; *Matthew* 89*; *Faith* 73*.

Cirrhosis of *)—*see* Pneumonia, Chronic Interstitial.

Fibrosis of *)—*John* 142; *Matthew* 134*; *Hope* 94, 226; *Elizabeth* 269.

Gangrene of—*Faith* 186*; *Hope* 122*; *Mary* 145*.

Infarction of—*Mark* ? 288*; *Hope* 2*, 3*; *Mary* 129*.

Pyæmic—*Luke* 297*.

Collapse of (transient)—*Luke* 155—*see* Diphtheria, Empyema, Pneumonia, &c. *Faith* 74*, 90*; *Elizabeth* 202*, 212*; *Mary* 58.

LYMPHADENOMA—*Matthew* 165*, 214; *Mary* 45.

MALARIA—*see* Ague.

MANIA—*Matthew* 36; *John* 205; *Casualty* 14.

MEASLES—*Mark* 18; *John* 84; *Faith* 109; *Hope* 109 122*, 125, 151, 158, 163; *Elizabeth* 6; *Mary* 138; *Radcliffe* 49.

MEGRIM—*Hope* 148.

MELANCHOLIA—*John* 33.

MENINGITIS—*Mark* 125*, 165*, 298*; *Luke* 134*, ? 157, 185*; *Matthew* 30*, ? 185, 233*; *Faith* 187; *Hope* 29, 216*; *Elizabeth* 198*, ? 251*; *Mary* 65*, 106, 139*.

Tubercular—*Luke* 1*, 312*; *John* ? 52*, 54*; *Matthew* 170*; *Faith* ? 38, 178*; *Hope* 54*, 152*, 173*; *Elizabeth* 184*, 235*; *Mary* 73*, 98*, 127*, 202*, ? 217; *Casualty* 15*.

See Pachymeningitis.

MENORRHAGIA—*see* Uterine.

MERCURIAL POISONING—*Matthew* 106, 294.

MORVAN'S DISEASE—*Matthew* 303.

MUSCULAR ATROPHY—*Luke* 62, 210, 251; *John* 78, 108, 170; *Matthew* 268, 292, 303.

Idiopathic—*Luke* 128, 178; *John* 123.

Progressive—*Luke* 138.

See Neuritis, Poliomyelitis.

MYELITIS—*Mark* 99*; *Luke* 43, 62, ? 88; *Matthew* 132; *Hope* ? post-febrile 33.

MYXEDEMA—*Elizabeth* 92, 200, 253.

NEPHRITIS—

Acute—*Mark* 262; *John* 194; *Matthew* 172; *Faith* 16*, 21, 26*, 65; *Elizabeth* 23, 63, 98, 132, 229; *Mary* 29, 38, 185*, 199*.

Chronic—*Mark* 31, 40, 57, 63*, 85*, 88, 119*, 147, 196*, 226*, 288*, 289*, 236A*; *Luke* 6, 18, 23, 25*, 74, 75, 107, 112, 130*, 133*, 137, 170*, 212, 264, 268, 294*, 321*; *John* 4*, ? 5, ? 10, 32*, 35, 48, 53*, 63, 65, 94*, 97*, 116, 125*, 129, 164, 174, 197; *Matthew* 21, 71, 78, 89*, 91*, 105, 125*, 139*, 142, 157*, 197*, 257*, 288*; *Faith* 8*, 35*, 98, 126*, 141, 148*, 157, 158; *Hope* 3*, 31*, 74*, 76, 85, 104*, 145*, 162, 167, 167A, 182*, 219; *Elizabeth* 10, 99*, 120, 141*, 216; *Mary* 24*, 35, 50*, 84, 118*, 121, 129*, 136, 144*, 146; *Martha* 85.

NERVOUS DEBILITY—*Hope* 97.

NEURALGIA—*Hope* 17 (of lumbosacral plexus); 88 (of cervico-brachial plexus) *Elizabeth* 162.

See Sciatica.

NEURITIS, Peripheral or multiple—*Luke* 78, 136, 160, ? 210, 274, 289, 290; *John* 87; *Hope* 165, 185, 203; *Elizabeth* 158; *Mary* 186.

*) Cases of contraction with consolidation, when originating in pleurisy, are classed as a fibrosis of lung, when in pneumonia, as chronic interstitial pneumonia. Fibroid phthisis includes cases with great contraction, consolidation, and cavities.

NEURO-MIMESIS—*Hope* 169 ; *Elizabeth* 100, 152.

NYSTAGMUS—*Luke* 82, 160, 281 ; *John* 162 ; *Faith* 38 ; *Hope* 142, 185 ; *Elizabeth* 68.

OBSTRUCTION—

Of Œsophagus ; see Dysphagia ; Cancer.

Of Intestines—*Mark* 201* ; *Luke* 150* ; *Faith* 8* , 182.

ŒDEMA GLOTTIDIS—*Luke* 321* , *Matthew* 173.

OPTIC NEURITIS—*Mark* 90, 291 ; *Luke* 1, 82, 89, 185* , 309* , *John* 20* , 190 ; *Faith* 120 ; *Mary* 195.

Atrophy—*Luke* 281, 290 ; *John* 3 ; *Mary* ? 106.

OSTEO-ARTHRITIS—*Luke* 277 ; *Faith* 70, ? 88 ; *Hope* 123, 177 ; *Mary* 26.

OTITIS and OTORRHOEA—*Mark* 273A, 291 ; *Luke* 185* , 297* , 309* , 316 ; *John* 2 ; *Faith* 97 ; *Hope* 81, 92, 186* , 216* ; *Elizabeth* 87, 154, 251* ; *Mary* 106, 123* , 139* ; *Casualty* 19.

OVARIAN CYST—

Of broad ligament—*Martha* 6, 18, 20, 34, 164, 185, 216, 221.

Ovarian—*Elizabeth* 143 ; *Mary* 192 ; *Martha* 14, 44, 25, 50, 56, 62, 77, 81, 111, 115, 116, 122, 123, 140, 171, 173, 181, 189, 203, 211, 227, 254, 255, 256, 257, 259, 262.

Parovarian—*Martha* 126, ? 129.

PACHY-MENINGITIS—

Cerebral—*Matthew* 29*.

Spinal—*Luke* ? 62.

PALATE—

Necrosis of—*Mark* 76.

Ulcer of—*John* 3, 142.

PANCREATIC DUCT, Obstruction to—*Matthew* 24.

PARALYSIS —

Agitans—*Matthew* ? 282 ; *Hope* 36 ; *Elizabeth* ? 176 ; *Mary* 187.

Of Cranial Nerves—*Mark* 125* ; *Faith* 12.

Diphtheritic—*Mark* ? 209* ; *John* 158 ; *Matthew* 284* ; *Faith* 62, 111
Hope 128, ? 225 ; *Elizabeth* 150 ; *Mary* 167.

Diver's—*Mark* 253.

Facial—*Luke* 77 ; *Elizabeth* 198*.

General, of Insane—*Mark* ? 285 ; *Luke* 305 ; *Matthew* 101.

Pseudo-hypertrophic—*Luke* 110.

Post-epileptic—*Hope* 81.

Spastic—*Elizabeth* 224.

See Lead, Hemiplegia, Hysteria, Paraplegia, Myelitis.

PARAMETRIC ABSCESS—*Martha* 16, 49, 54, 61, 73, 74, 102, 131, 135, 153, 208, 222.

PARAMETRITIS—*Martha* 31.

PARAPLEGIA—*Mark* 42 ; *Luke* 169 ; *Hope* 30* ; *Elizabeth* 59.

Ataxic—*Mark* ? 99* ; *John* 162.

Spastic—*Mark* 264 ; *Luke* 43, 62, 88, 210, 258 ; *Matthew* 262, 303 ;
Hope 33, 142, 185, 223, 224.

See Paralysis (Diphtheritic, Diver's).

PELIOSIS—*John* 1 ; *Matthew* 103 ; *Elizabeth* 178.

PELVIC ABSCESS—*Martha* 17* , 46, 206, 230.

PELVIC HÆMATOMA—*Martha* 29, 55.

PELVIC INFLAMMATION—*Martha* 32, 151.

PELVIC PAIN—*Martha* 112.

PELVIC TUMOUR—See Tumour.

PELVIS—

Contracted—*Martha* 51, 72, 148, 159.

Scoliotic—*Martha* 21.

PEMPHIGUS—*Mark* 196* ; *Matthew* 174 ; *Faith* 157 ; *Elizabeth* 202*.

PERFORATION—

Of Duodenum—*Matthew* 151*.

Of Intestine—*Mark* 92* ; *Luke* ? 187, 317* ; *Matthew* 290*, 296* ; *Faith* 177* ; *Hope* 195*, 229* ; *Elizabeth* 255 ; *Mary* 18*.

Of Stomach—*Hope* 193*.

PERICARDITIS—*Mark* 5, 114, 225, 265, 276, 290 ; *Luke* 205, 244, 252, 320, 321* ; *John* 42*, 71, 102, 106*, 135, 138A, 157 ; *Matthew* 25, 81*, 86, 108*, 154*, 197*, 217*, 238*, 260 ; *Faith* 9, 35*, 44, 90*, 91 ; *Hope* 74*, 139, 219 ; *Elizabeth* 7*, 37, 93*, 134, 151, 175*, 211 ; *Mary* 75*, 165 ; *Casualty* 19.

PERIHEPATITIS—*John* 125*, 163*.

PERIMETRIC ABSCESS—*Martha* 35, 76, 248.

PERIMETRITIS—*Hope* 159, 182* ; *Elizabeth* 91 ; *Mary* 172 ; *Martha* 8, 13, 17*, 57, 59, 75, 89, 101, 110, 121, 137, 141, 142, 145, 160, 169, 179, 183, 192, 214, 223 ; *Casualty* 7, 10.

PERINÆUM, Rupture of—*Martha* 45, 48, 97, 130, 147, 158, 241.

PERIOSTITIS—*Mark* 169 ; *John* 42* ; *Elizabeth* 251*.

PERITONITIS—

Acute—*Mark* 201* ; *Luke* 40, 167*, 223 ; *Matthew* ? 78, 97, 125*, 200, 233*, 238* ; *Faith* 8*, 16* ; *Hope* 55 ; *Elizabeth* 93*, 113 ; *Mary* 115, 170, 192 ; *Casualty* 17*.

Localized—*Mark* 277, 277A—see Perityphlitis, Perihepatitis, Perimetritis, Parametritis.

Purulent or Septic—*Mark* 92* ; *Luke* 317* ; *John* 153* ; *Matthew* 151*, 290*, 296* ; *Faith* 177* ; *Hope* 193*, 195*, 229* ; *Elizabeth* 255 ; *Mary* 3, 55* ; *Martha* 197, 240*, 250*.

Chronic or Tubercular—*Mark* 184, ? 284 ; *Luke* 50, ? 122, 150*, 322* ; *John* 93, 163* ; *Matthew* 181*, ? 287 ; *Faith* 34*, 122 ; *Hope* 15, 104*, 182* ; *Elizabeth* 84, 214*, ? 223 ; *Mary* 39, 144* ; *Martha* 207* ; *Casualty* 15*.

PERITONITIS—Sequelæ of—*Mark* 175.

PERITYPHLITIS—*Mark* 9, 81, 111, 137, 176, 275, ? 299 ; *Luke* 4, 53, 91, 150*, 171, 221 ; *John* 40, 188 ; *Matthew* 31, 75, 158, 193, 264, 266, 287, 300 ; *Hope* ? 159 ; *Elizabeth* 11, 187 ; *Mary* 68.

PERITYPHLITIC ABSCESS—*Mark* 111.

PERTUSSIS—*Mark* 273 ; *Luke* 48 ; *Matthew* 17 ; *Faith* 7*, 56, 57, 93, 109, 134*, 198* ; *Hope* 51*, 113, 192 ; *Elizabeth* 16, 28, 45, 69*, 161, 213.

PHLEBITIS—see Thrombosis.

PHLEGMASIA ALBA—*Faith* 76 ; *Martha* 10.

PHTHISIS PULMONALIS (including Acute Tuberculosis of Lung)—*Mark* 2, ? 29, 46, 48, 53, 140*, ? 210, 220, 223, 236, 236A, 240*, 245*, 295 ; *Luke* 2*, 11, 12, 38, 99, ? 106, 130*, 139, 196*, 211, 249, 260, 269, 322* ; *John* 56, 61, 154, 178 ; *Matthew* 15, 37*, 83*, 93*, 108*, 114, 126, 128, 130*, 162, 182*, 208*, 219*, 243, 254, 277 ; *Faith* 46, 101*, 140, ? 145, 178* ; *Hope* 26*, 51*, 78 ; *Elizabeth* 47*, 85, 157, 177, 235*, 260*, 261 ; *Mary* 2*, 127*, 135, ? 176, 218.

Fibroid ^{a)}—*Mark* 238 ; *Luke* 9 ; *Matthew* 45 ; *Hope* 94, 226.

PITYRIASIS RUBRA—*John* 152.

PLACENTA PRÆVIA—*Martha* 260.

PLACENTA, RETAINED—*Martha* 128, 168 ; *Casualty* 11, 18.

^{a)} See foot-note, page 37.

PLEURAL EFFUSION—*Mark* 46, 58, 60, 89, 121, 128, 155, 162, 163, 206*, 241, 272 ; *Luke* 40, 174, 179, 215, 244, 254, 273, 285, 288, 313, 318, 322* ; *John* 37, 75, 89, 117, 157 ; *Matthew* 28*, 33, 46, 48, 78, 102, 108*, 110, 112, 143, 146, 159, 166, 183, 195, 199, 205, 211, 217*, 230, 274 ; *Faith* 35*, ? 49, 116, 132, 136 ; *Hope* 49, 95, 104*, 149, 168 ; *Elizabeth* 1, 98, 99*, 115, 116, 169, 237*, 250 ; *Mary* 13*, 25, 43, 103, 142, 144*, 176, 185*, 204* ; *Casualty* 17.

PLEURISY—*Mark* 87, 161, 203, 238, 254 ; *Luke* 29 ; *John* 22, 42*, 79*, 92*, 106*, 124, 179, 189* ; *Matthew* 69*, 80*, 81*, 100, 125*, 181*, 192, 194, 197*, 207, 208*, 218 ; *Faith* 3*, 14, 16*, 90*, 93, 98, 106*, 119, 151, 163 ; *Elizabeth* 7*, 39, 93*, 103, 130, 134 ; *Mary* 131, 199*.

Sequelæ of—*Luke* 15 ; *John* 41* ; *Matthew* 134*.

See also Phthisis—fibroid.

PNEUMONIA—

Lobar or Croupous—*Mark* 10*, 13, 17, 20, 32, 35*, 38A*, 52, 59, 62*, 63*, 64*, 68, 71, 76, 77, 78*, ? 100, ? 103, 107, 108, 109, 110*, 112, 113, 114, 115*, 116, 117, 118, 120, 124, 127, 129, 136, 138, 144, 153, 154, 156*, 167, 168, 170, 172, 179, 183, 192, 207, 211, 213, 232, 234, 235, 247, 249, 274, 280*, 281, 283 ; *Luke* 17*, 36, 41, 46, 47, 60, 70, 86, 93*, 95, 100*, 101, 109, 117, 121, 129, 135, 141, 142, 143, 144, 147, 148, 162, 166, 172, 173, 177, 182, 186, 192, 193, 202, 216, 217*, 219, 222, 234, 237, 252, 255, 256, 259, 271, 275, 279, 282, 283, 298, 301, 310*, 315, 319 ; *John* 8*, 13, 14, 27, 30, 34, 41*, 43, 47, 51, 57, 58*, 62, 64*, 65, 66, 76, 79*, 80, 81, 83*, 94*, 95, 96, 99, 101, 103, 105, 106*, ? 107, 110, 111*, 112, 113, 114, 120, 121, 122, 127, 131, 132, 133, 144, 145, 149, 167, 168, 179, 183, 185, 186, 191*, 195, 196, 203 ; *Matthew* 5, ? 8, 9, 10, 12, 14, 23, 36, 40, 43, 47, 49, 50, 53, 54, 55, 58, 62, 63, 65*, 72, 80*, 81*, 88, 90, 94, 95, 96, 99, 104, 113*, 115, ? 116, 121, 129*, 136, 138, 141*, 144, 145, 148, 149, 150, 155, 160*, 164, 167, 176, 178, 185, 190, 198, 201, 209, 220*, 221, 226, 231, 238*, 241, 242, 245, 248, 249, 250, 251, 252, 261, 270, 275, 278, 279, 286*, 288*, 291 ; *Faith* ? 4, 5, 9, 18, 24*, 36, 51, 61, 63, 71, 72, 76, 81, 82*, 83, 84, 91, 95, 100, 118, 121, 130, 133, 142, 143, 160, 188, 192 ; *Hope* 18, 40, 47, 69, 83, 84, 86, 90, 99, 100, 101, 107, 108, 110, 115, 120, 125, 126, 147, 157, 163, 186*, 200, 218 ; *Elizabeth* 44, 64, 73, 75, 79, 80, 83, 88, 94, 96, 101, 109*, 111, 118, 123, 124, 142, 156, 164, 165, 169, 174, 182, 183, 215, 221, 222, 246, 247, 270 ; *Mary* 14, 19, 27, 48, 49, 66, 67, 75*, 88, 93, 101, 102, 107, 113, 117, 120, 124, 140, 148, 163, 181, 203, 209 ; *Casualty* 13, 19.

Lobular and Catarrhal—*Mark* 18, 273A* ; *Luke* 295 ; *Matthew* 70, 106, 108*, 169*, 202*, 208* ; *Faith* 6, 54*, 66*, 73*, 80, 93, 106*, 117*, 123*, 134*, 139, 155, 198*, 200, 201* ; *Hope* 51*, 68, 96, 122* ; *Elizabeth* 3*, 7*, 28, 56*, 61, 69*, 122, 135, 137, 146, 149, 161, 172, 173, 179, 180*, 201*, 230, 244 ; *Mary* 9, 12*, 33*, 56, 73*, 94*, 97*, 109*, 147, 198.

Chronic Interstitial ^{a)}—*Luke* 16 ; *Matthew* 152, 244* ; *Faith* 20.

PNEUMO-THORAX—*Luke* 16, 215.

See Pyo-pneumo-thorax.

POISONING—*Mark* 152 (opium) ; *John* 21 (turpentine), 82 (hydrochloric acid), 155 (phosphorus) ; *Faith* 108 (iodine), 113 (carbolic acid) ; *Elizabeth* 136 (carbolic acid), 191 (sulphuric acid), 194 (ptomaines).

See Lead—Mercury.

POLIO-MYELITIS—*Matthew* 292.

POLYURIA—*Mark* 2 ; *John* 63.

PREGNANCY, Extra-uterine—*Martha* 52, 157*, 190.

PRIAPISM—*Matthew* 82.

PSORIASIS—*John* 159.

^{a)} See foot-note, page 37.

PUERPERAL ALBUMINURIA—*Faith* 196; *Martha* 85, 109.

PUERPERAL AMAUROSIS—*Faith* 196.

PUERPERAL CONVULSIONS—*Faith* 196; *Martha* 36*.

PUERPERAL SEPTICÆMIA—*Hope* 49; *Martha* 215, 138*; *Casualty* 5, 9*, 12, 20.

PURPURA—*Mark* 78*; *John* 73*; *Faith* 31*, 127; *Hope* 29; *Elizabeth* 160A*; *Mary* 152.

PYÆMIA—

Acute—*Elizabeth* 251*; *Casualty* 19.

Chronic—*Elizabeth* 238.

PYELITIS—*Mark* 31.

PYO-NEPHROSIS—*Luke* 58*; *Elizabeth* ? 189.

PYO-PNEUMO-THORAX—*Mark* 94, 268*; *Luke* 310*; *Matthew* 83*; *Elizabeth* 252*; *Casualty* 19.

PYURIA—*Mark* 66, 13; *John* 7; *Hope* 227; *Mary* 189.

See Cystitis, Pyelitis, Pyo-nephrosis.

RAYNAUD'S DISEASE—*Mark* ? 169; *Elizabeth* 256.

RETINITIS ALBUMINURICA—*Mark* 40, 88; *Luke* 107; *John* 97*, 116; *Matthew* 78; *Elizabeth* 10, 216.

RHEUMATISM—*Mark* 14, 19, 23, 33, 50, 114, 151, 173, 186, 195, 224, 231, 265, 270, 279, 290; *Luke* 3, 32, 35, 81, 145, 220, 227, 229, 233, 238, 261, 265, 292, 307; *John* 1, 2, 12, 38, 88, 126, 128, 135, 137, 138A, 160; *Matthew* 8, 16, 25, 35, 39, 42, 85, 147, 161, 177, 180, 213, 223, 234, 237, 253, 258, 260, 265, 273, 289; *Faith* 1, 9, 11, 13, ? 88, 94, 125, 154, 194; *Hope* 7, 24, 43, 46, 48, 87, 89, 106, 116, 133, 135, 146, 172, 175, 187, 204, 209, 214, 226; *Elizabeth* 25, 50, 76, 133, 138, 144, 151, 175*, 185, 193, 203, 209, 211, 233, 236, 257; *Mary* 17, 22, 23, 46, 62, 92, 104, 114, 122, 130, 131, 149, 159, 161, 173, 177, 178, 188, 191.

RHEUMATOID ARTHRITIS—see Osteo-arthritis.

RICKETS—*Faith* 52, 74*, 109, 117, 142, 144, 145; *Hope* 210; *Elizabeth* 46, 56, 161, 172; *Mary* 60.

SCARLATINA—*Faith* 122; *Radeliffe* 101.

SCIATICA—*Mark* 86; *Luke* 79, 248; *Matthew* 207; *Hope* 17; *Elizabeth* 102, 196; *Mary* 173.

SCLEROSIS—

Amyotrophic—*Luke* ? 62.

Lateral—see Paraplegia, spastic.

Multiple—*Hope* ? 33, ? 142, ? 185, 215; *Mary* 162.

SEPTICÆMIA—*Luke* 297*; *John* 42*.

See Puerperal.

SPEECH—

Agraphia—*Luke* 77.

Aphasia—*Mark* 75; *Luke* 77, 323; *Matthew* 118, 127, 175, 187; *Faith* 33; *Hope* 73*, 111; *Mary* 111.

Aphonia—*John* 165; *Matthew* 124*; *Mary* 155*.

Other affections of—*Luke* 305; *Matthew* 101, 294; *Hope* 215, 206, 207.

SPINAL ASTHENIA—*John* 108.

SPINAL CARIES—see Caries.

SPINAL IRRITABILITY—*Luke* 271; *Hope* 97; *Elizabeth* 54.

SPLEEN—

Enlargement of—*Mark* 15, 78*, 150*, 256, 263, 271, 284; *Luke* 104, 312*; *John* 150; *Matthew* 69*, 82, 165*, 267; *Hope* 94, 182*, 189, 210, 220; *Elizabeth* 2, 157, ? 228, 238; *Mary* 40*, 132.

Infarction of—*Mark* 78*, 135*, *John* 199*; *Hope* 73*; *Elizabeth* 160A*.

STOMACH—

Cancer of—*see* Cancer.

Dilatation of—*Mark* 70, 139 ; *Luke* 39*, 197, 280 ; *Hope* 35 ; *Mary* 207.

Ulcer of—*Mark* 45 ; *Luke* 25* ; *John* 104, 153* ; *Matthew* ? 20 ; *Faith* 153, ? 158, ? 164, 190 ; *Hope* 174, 191, 193*, 199, 208 ; *Elizabeth* 53, 72, 119, 168, 227, 258, 271 ; *Mary* 32, 37, 87, 95*, 99, 134.

SUPRA-RENALS—

Tubercular disease of—*Mark* 236, 236A*—*see* Addison's Disease.

Cancer of—*See* Cancer.

SYPHILIS—

Cerebral—*John* 3.

Arthritis in—*Mark* 200.

Congenital—*Faith* 128 ; *Hope* 92 ; *Elizabeth* 256.

SYRINGO-MYELIA—*Luke* ? 62 ; *Matthew* 303.TABES DORSALIS—*Mark* ? 11, 178, 182 ; *Luke* 277, 281 ; *Mary* 10.TETANUS—*John* 138* ; *Mary* 34*.THROMBOSIS—*Mark* 12 ; *Luke* 293 ; *John* 161 ; *Matthew* 36, 120, 281, 299* ; *Faith* 91 ; *Hope* 59, 164* ; *Elizabeth* 65*, 145 ; *Casualty* 9*.

Of Cerebral Sinuses—*Mark* 291 ; *Hope* 153*.

Of Pulmonary Artery—*John* 189* ; *Matthew* 278* ; *Elizabeth* 65* ; *Martha* 94*.

See also Phelgmasia.

TONSILLITIS—*Mark* 72, 79, 259, 296 ; *Luke* 8, 199, 263 ; *John* 35, 68, 135 ; *Matthew* 25, 78, 111, 168, 184, 271, 302 ; *Faith* 32, 87, 96, 205 ; *Hope* 5, 38, 53, 127 ; *Elizabeth* 2, 33, 121, 140, 197, 206 ; *Mary* 1, 52, 61, 126, 160 ; *Radcliffe* 102.TREMOR—*Luke* 27, 62, 191 ; *John* 162 ; *Matthew* 106, 282, 294 ; *Hope* 36, 130, 142, 185, 215.TUBERCULOSIS—*Mark* 165*, 209*, 236, 236A*, 245*, 284 ; *Luke* 312* ; *John* 54*, 120 ; *Matthew* 37*, 277* ; *Faith* ? 38, 66*, ? 162, 178* ; *Hope* 26*, 37*, 54* ; *Elizabeth* 36*, 184*, 214*, 223, 235*, 252* ; *Mary* 13*, 33*, 73*, 98*, 105*, 202*.

See Addison's Disease, Meningitis, Peritonitis, Phthisis, Supra-renals.

TUMOUR—

Fatty, of Vulva—*Martha* 198.

Fibroid, of Uterus—*Martha* 5, 27, 46, 65, 66, 78*, 80, 90, 94*, ? 199, 225, 234.

Pelvic—*Martha* 108, 209, 246.

Of uncertain nature, Abdominal—*Mark* 37 ; *Faith* 204 ; *Hope* 4, 105, 143 ; *Elizabeth* 228.

Mediastinal—*Matthew* 210.

See also Cancer.

TYPHOID FEVER—*Mark* 3*, 12, 62*, 66B, 83, 142, 180*, 199*, 205*, 217, 246, 252, 267, 269, ? 273A, 278 ; *Luke* 45*, 51, 188, 189, 194, 195, 198, 224, 225, 232, 253, 262, 284, 286, 287, 314, 317* ; *John* 24, 119, 146, 147, 148, 175, 189*, 198, 199* ; *Matthew* 6, 11, 18, 25, 44, 202*, 225, 229, 233*, 272, 290*, 296* ; *Faith* 24*, 159, 165, 167, 168, 169, 176, 179, 183, 190, 193*, 203 ; *Hope* 1, 140, 155, 195*, 197, 221, 227, 229* ; *Elizabeth* 12, 48, 52*, 82 ; 126, 153*, 167, 170, 192, 204, 226, 249, 255, 264, 267 ; *Mary* 55*, 153, 155*, 158, 164, 169, 174*, 175, 193, 211, 216.TYPHUS FEVER—*Faith* 129.URÆMIA—*John* 4* ; *Matthew* 78, 91*, ? 133*, ? 187, 257*.

URETHRA—

Caruncle of—*Martha* 30, 42, 67, 98, 124, 166, 210, 217, 218.

Prolapse of—*Martha* 193.

UTERINE CERVIX—

Catarrh of—*Martha* 47, 196, 213.

Elongation and hypertrophy of—*Martha* 37, 236.

Erosion of—*Martha* 22, 70, 71, 91, 93, 261.

See Cancer.

UTERINE HÆMORRHAGE—*Faith* 35*, 55 ; *Hope* 41 ; *Elizabeth* 71 ; *Martha* 63, 113, 154, 162, 177, 205, 219, 228, 231, 243 ; *Casualty* 8.

Accidental—58, 64, 133*, 195, 229.

After Abortion—38, 84.

Post partum—2.

See also Uterine Cervix, Erosion of ; Tumour, fibroid.

UTERUS—

Inversion of—*Martha* 15.

Mole of—*Martha* ? 60.

Polypus of, Mucous—*Martha* 172, 226.

Fibro-cystic—*Martha* 155.

Fibrous—*Martha* 4, 9, 83, 143, 194, 233.

Prolapse of—*Martha* 40, 108, 161, 186, 187, 235, 247.

Retro-version of—*Casualty* 4.

See also Cancer, Tumour.

VAGINA (*Martha*), Cyst of—204 ; fibrous tumour of, 53 ; vaginitis, 120, 239.

See also Fistula.

VARICELLA—*Mary* 80.

VARIOLA—*Luke* 69, 97 ; *John* 115.

VERTIGO—*Matthew* 123.

Auditory—*Luke* 115.

VOMITING—*Mark* 146 ; *Luke* 34, 126, 168 ; *John* 19, 151 ; *Matthew* 24 ; *Hope* 70, 87, 102, 103 ; *Mary* 7, 51.

VULVA (*Martha*), Hæmatoma of—152 ; ulceration of, 139.

See also Cancer, Tumour.

SURGICAL REPORT.

TABLE I. (continued).

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TABLE I. (continued).

DISEASE.	Total.	Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
TUMOURS (continued).																							
Cysts (continued)—																							
Serous ...	3	..	3	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..
Sero-Cystic Tumour of Breast	2	..	2	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..
Abdominal Tumour	4	2	2	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	1	..	..	..
Adeno-Fibroma—																							
Breast ...	24	..	24	..	..	..	..	..	..	1	..	2	..	17	..	2	..	2	..	..	..	..	..
Enchondroma—																							
Glands of Groin	1	1	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..
Hand ...	2	1	1	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Parotid ...	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Neck ...	1	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Exostosis—																							
Femur ...	1	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Humerus	3	3	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Jaw (Upper)	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
Phalanx...	8	2	6	..	..	..	..	..	..	..	..	1	2	1	4	..	..	..	..	..	..	..	..
Tibia ...	4	..	..	..	..	..	..	1	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Fibroma—																							
Finger ...	1	..	1	1
Groin ...	1	1	1
Jaw ...	5	1	4	1	1	1	..	2

TABLE I. (continued).

[illegible]

TABLE I. (continued).

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TABLE I. (continued).

DISEASE.	Total.		Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
TUMOURS (continued).																								
Thyroid— <i>Bronchocele</i>	8	2	5	1	...	...	...	...	...	...	...	...	...	...	2	4	...	1	...	...	...	...	...	1
Multiple Spontaneous— <i>Hæmatonata</i>	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Multiple Subcutaneous— Tubercular Tumours ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
MALFORMATIONS AND DEFORMITIES.																								
Anus Imperforate	4	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cleft Palate... ..	26	13	13	...	5	4	...	6	4	...	1	3	...	1	...	1	...	...	...	...	...	...	...	...
Congenital Dislocation of Hip	3	1	2	...	...	...	...	...	1	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...
Congenital Stricture of Rec- tum	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Contracted Finger	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Contracted Hamstrings ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
Extroversion of Bladder ...	1	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Genu Valgum	26	15	11	...	5	4	...	2	...	...	3	4	...	6	1	...	...	...	...	...	...	...	...	...
Genu Varum	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hallux Valgus	4	3	1	...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	...	...	...	...	...	...

DISEASE.	Total.		Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
MALFORMATIONS AND DEFORMITIES (continued).																									
Hammer Toe	3	5	...	...	...	...	...	...	1	1	...	2	2	...	2	...	...	...	...	...	...	...	...
Hare-Lip	30	17	...	...	15	11	...	2	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Hypospadias	4	4	...	...	1	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phimosis	14	12	...	...	2	...	2	...	6	...	...	...	2	...	...	...	1	...	...	...	...	...	...
Rickety Curvature of Tibiæ	11	5	...	...	3	5	...	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spina Bifida	4	2	...	...	1	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spine, Lateral Curvature	2	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Supernumerary Toe	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Talipes—																									
<i>Caldaneus</i>	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Cuneus</i>	1	1	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
<i>Equinus</i>	4	1	...	...	1	...	1	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...
<i>Equino-Varus</i>	20	11	...	...	3	2	...	3	3	...	...	1	...	1	...	1	1	...	2	...	...	...	...
<i>Valgus</i>	14	6	...	...	...	...	...	1	...	1	...	2	5	2	1	...	1	...	...	1	...	...	...
<i>Wry Neck</i>	4	2	...	...	...	...	...	...	1	2	...	...	1	...	...	...	...	...	...	...	...	...	...
DISEASES OF THE NERVOUS SYSTEM.																									
Cerebral Abscess	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
Epilepsy	4	4	...	...	1	...	...	...	...	...	...	...	1	...	1	...	1	...	...	...	...	...	...
Facial Spasm	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...

DISEASE.	Total.		Died.		Under 5.	— 10.	— 15.	— 20.	— 30.	— 40.	— 50.	— 60.	Over 60.
	M.	F.	M.	F.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.	Discharged.
DISEASES OF THE EYE (continued).													
Retina, Optic Nerve, and Vitreous Humour—													
Detached Retina ...	4	3	1	...	...	...	...	...	2	...	...	1	...
Embolism of Central Artery ...	1	...	1	...	...	...	...	...	...	...	...	...	...
Intraocular Hæmorrhage	1	1	...	...	...	...	...	...	1	...	1	...	...
Optic Atrophy ...	1	1	...	...	...	...	...	1	...	...	...	...	...
Optic Neuritis ...	1	...	1	...	...	...	...	...	...	...	...	...	...
Toxic Amblyopia ...	2	2	...	...	...	...	...	...	2	...	...	...	...
Choroid—													
Albinism ...	1	1	...	...	...	...	...	1	...	...	...	...	...
Chorioiditis ...	5	2	2	1	...	...	1	1	...	...	1	...	...
Melanotic Sarcoma ...	1	...	1	...	...	...	...	...	...	...	...	...	...
General Affections of the Eye—													
Amaurosis ...	1	...	...	...	...	...	...	...	...	...	...	...	...
Buphthalmos ...	1	1	1	1
Xerophthalmos ...	1	1	1
Glaucoma ...	20	5	15	1	...	2	4	1
Panophthalmia ...	3	2	1	1

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TABLE I. (continued).

DISEASE.	Total.	Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
		M.	F.	M.	F.	Discharged.	Died.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
DISEASES OF THE EYE (continued).																							
Diseases of the Orbit—																							
Abscess ..	2	2	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Dermoid Cysts ..	6	3	3	..	..	..	..	1	1	1	1	1	1	..	..	..	..	1	1	..	..	..	..
Stump ..	1	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ptosis ..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
DISEASES OF THE EAR.																							
Otitis Media ..	34	15	14	4	1	1	1	3	1	2	5	1	2	1	3	2	2	6	1	1	1	..	..
DISEASES OF THE NOSE AND ANTRUM.																							
Depressed Bridge ..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Empyema of Antrum ..	3	3	..	..	..	..	..	1	1	..	..	..	..	..	..	..	2	..	..	..	..	..	..
Epistaxis ..	3	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Foreign body in ..	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hypertrophied Turbinate ..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Nasal Fistula ..	1	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Septum Deviated ..	11	8	3	..	..	..	..	..	2	..	2	3	..	2	1	..	1	..	..	..	..	..	..

TABLE I. (continued).

DISEASE.	Total		Discharged.	M.	F.	Died.	Under 5.	- 10.	- 15.	- 20.	- 30.	- 40.	- 50.	- 60.	Over 60.
			M.	F.	M.	F.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.	Discharged.	Died.	Discharged.
							M.	F.	M.	F.	M.	F.	M.	F.	F.
DISEASES OF THE DIGESTIVE SYSTEM.															
Mouth— Cancerous Orit	5	1	3	..	..	..	1	3	..	..	..	..	..	..	..
Gingivo - buccal Adhesions	1	1	..	..	..	1	..	..	..	..	..	..	..	..	..
Rubulae	1	1	..	..	..	..	..	..	..	1	..	..	..	1	..
Stomatitis	2	..	1	..	..	..	1	..	..	..	..	..	..	..	..
Tongue— <i>Acute Glossitis</i>	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..
Salivary Glands— <i>Salivary Fistula</i>	1	1	..	..	..	..	..	..	..	..	..	1	..	..	..
Tonsils— <i>Enlarged</i>	7	3	4	..	..	..	..	..	2	1	1	1	..	..	..
Inflamed	3	2	1	..	..	..	..	..	..	1	1	..	..	..	..
Lip— <i>Acute Cheloma</i>	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..
Pharynx— <i>Adenoid Vegetations</i>	32	14	18	3	2	6	3	4	5	6	1	2
<i>Foreign Body in Granular Pharyngitis</i> ...	1	2	2	1	1	1

TABLE I. (continued).

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DISEASE.	Total.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
	M.	F.	M.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.	Discharged.	F.
DISEASES OF THE GENITO-URINARY ORGANS (<i>contd.</i>).																						
Spermatic Cord—																						
<i>Variocoele</i> ...	40	...	...	...	...	...	...	...	1	...	20	...	14	...	4	...	...	...	...	...	...	...
Tunica Vaginalis—																						
<i>Hydrocoele</i> ...	15	...	...	...	1	...	...	...	...	...	2	...	6	...	1	...	2	...	...	1	...	...
<i>Hematocele</i> ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
Testis—																						
<i>Orchitis and Epididymitis</i> ...	8	...	...	...	...	...	...	...	...	...	1	...	3	...	3	...	1	...	...	...	...	...
<i>Retained Testis</i> ...	2	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Syphilitic Disease</i> ...	4	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	1	...	...	...	...	...
<i>Tubercular Disease</i> ...	13	...	1	...	...	...	...	...	...	3	...	...	3	...	2	...	1	...	2	...	1	...
Urethra—																						
<i>Calculus</i> ...	3	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...
<i>Caruncle</i> ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
<i>Fistula</i> ...	8	...	...	...	...	...	...	...	...	...	...	...	3	...	2	...	...	...	1	...	...	...
<i>Stricture</i> ...	43	...	2	...	...	...	...	...	1	...	...	...	7	...	8	...	16	...	4	...	7	...
Urine and Urination—																						
<i>Dysuria</i> ...	2	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...
<i>Extravasation</i> ...	5	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	2	...	...	...
<i>Hæmaturia</i> ...	7	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	1	...	2	...	...

TABLE I. (continued).

DISEASE.	Total.		Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
DISEASES OF THE ORGANS OF LOCOMOTION.																								
Bone : Diseases of —																								
Caries—																								
Femur ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Malar ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mastoid ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Metatarsus ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Os Calcis ...	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phalanx...	3	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spine ...	43	29	11	11	6	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ulna ...	3	1	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tibia ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Necrosis—																								
Femur ...	6	5	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Humerus ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jaw Bones ...	6	5	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Malar ...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Metacarpus ...	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Metatarsus ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Os Calcis ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Patella ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phalanx...	6	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Radius ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rib ...	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Skull ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tibia ...	10	8	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tarshian bone ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE I. (continued).

DISEASE.	Total.																			
	Discharged.		Died.	Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.
	M.	F.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
DISEASES OF THE ORGANS OF LOCOMOTION (<i>continued</i>). Joints (<i>continued</i>)— Old Excisions— <i>Elbow</i> <i>Knee</i>	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
	3	2	1	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..
Old Osteotomy of Femur ...	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
DISEASES OF THE BURSÆ, FASCITE, AND TENDONS.																				
Inflamed and Suppurating Bursæ— <i>Ischial</i> <i>Gleceranon</i> <i>Patellar</i> Simple Enlargement of Bursæ— <i>Ischial</i> <i>Patellar</i> <i>Popliteal</i> Ganglia— <i>Simple</i> <i>Compound</i> <i>Dupuytren's Contraction</i> <i>of Palmar Fascia</i> <i>Ruptured Muscle</i>	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
	4	4	..	..	..	..	..	..	..	..	..	1	..	3	..	..	..	1	..	..
	18	3	15	1	4	..	9	..	1	..	1	1	..	1	..
	2	2	1	1	1	..
	11	3	8	4	..	1	..	1	2	..	2	..
	3	2	1	1	1	..	1	1	..	1	..
	5	1	4	1	..	2	1
	2	2	2
	4	3	1	2	1	1	..
	3	3	1	..	1	1	1	..

TABLE I. (continued).

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TABLE I. (continued).

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TABLE I. (continued).

INJURY.	Total.	Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
		Discharged.		Died.		Discharged.		Died.		Discharged.		Died.		Discharged.		Died.			
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
INJURIES OF THE BACK.																			
Foreign body in Muscles of Back	2	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..
Contusions	9	8	1	..	..	..	..	1	..	1	..	3	..	2	..	..	..	1
Concussion of Spine	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Fracture—Dislocation of Spine	5	2	1	2	..	..	..	..	..	..	..	2	..	1	1	..	..	..
INJURIES OF THE PELVIS AND GENITAL ORGANS.																			
Contusions	3	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..
Wounds—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Penis</i>	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Perineum</i>	5	3	2	..	..	1	1	..	..	1	..	..	..	1	..	..	..	..
<i>Vulva</i>	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Fractures—	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Pelvis</i>	3	..	1	1	..	..	..	..	..	..	..	1	..	..	..	1	..	1
Rupture of Urethra	3	3	..	..	..	1	..	..	..	..	..	1	..	..	1	..	..	..
INJURIES OF THE UPPER EXTREMITY.																			
Foreign body in	2	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..
Contusions	4	3	1	..	..	..	..	1	..	1	..	..	..	1	..	..	..	..
Wounds	22	19	2	1	..	1	..	4	1	1	1	4	..	6	..	1	..	2	

INJURY.	Total.	Discharged.		Died.		Under 5.		— 10.		— 15.		— 20.		— 30.		— 40.		— 50.		— 60.		Over 60.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
INJURIES OF THE UPPER EXTREMITY (<i>continued</i>).																							
Injuries of Nerves—																							
<i>Brachial Plexus</i> ...	1	1	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...
<i>Median</i> ...	4	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Ulnar</i> ...	7	4	3	...	...	...	...	...	...	...	...	2	...	2	1	...	1	...	...	...	...	...	...
Rupture of Brachial Artery	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tendons Divided ...	8	7	1	...	...	...	...	...	...	...	...	2	...	2	...	...	...	...	2	1	...	...	...
Fractures—																							
(Simple)—																							
<i>Clavicle</i> ...	4	3	1	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...
<i>Scapula</i> ...	4	3	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
<i>Humerus</i> ...	3	3	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...
(<i>Separation of Epiphy-</i>																							
<i>ses</i>) ...	1	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Olecranon</i> ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...
<i>Radius (Colles')</i>	2	1	1	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...
(<i>Separation of Meta-</i>																							
<i>carpal Epiphysis</i>) ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(Compound)—																							
<i>Radius and Ulna</i>	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
<i>Metacarpal</i>	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
<i>Phalanx</i> ...	5	5	...	...	...	...	...	...	...	...	2	...	...	...	...	1	...	...	...	1	...	...	...
(Old)—																							
<i>Humerus</i>	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
<i>Radius and Ulna</i>	2	1	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...
<i>Colles'</i> ...	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...

TABLE I. (continued).

[illegible]

APPENDIX TO TABLE I.

DISEASES OF THE EYE.

A man, aged 57, admitted for cataract, died some weeks later of acute bronchitis.

A man, aged 18, with irido choroiditis, died of phthisis.

An infant of one year, admitted with a corneal ulcer after measles, died of asthenia on the following day.

Another infant, of the same age, admitted for corneal opacities, died of tubercular meningitis.

ANTHRAX.

There was one case, that of a boy of 16, whose occupation was that of stuffing chairs with Russian horse hair. The point of inoculation was the chin. The sore was excised on the fourth day with success.

CRETINISM.

A cretin, aged 12, was treated with thyroid gland with considerable benefit.

GANGRENE.

Two male patients, both over 60 years of age, died of idiopathic gangrene of the lower extremity. Amputation through the thigh was performed in one of these cases. The other had glycosuria.

Three other male patients recovered without amputation.

A man, aged 66, died of gangrene of the penis, two days after admission.

A woman, aged 30, with dry gangrene of the hand and forearm; recovered after amputation.

There were two cases of spontaneous gangrene of the whole external ear, in children aged 5 and 3.

A child of 13 months was admitted with spontaneous gangrene of the thigh, and died within a few hours.

There were three cases of traumatic gangrene of the finger; all recovered.

HÆMORRHAGE.

An infant of 3 weeks died of hæmorrhage from the umbilicus.

TETANUS.

A man, aged 29, died of acute tetanus fourteen days after crushing his finger with a heavy stone.

Another man, aged 47, died of the same disease on the eighth day after wounding his foot with a nail, and on the fourth day after the onset of symptoms.

PARASITES.

Two cases of hydatid, of the liver and peritoneum respectively, were successfully treated by abdominal section and drainage.

VENEREAL DISEASES.

A man, aged 21, admitted for gonorrhœa and prostatic abscess died with peritonitis and valvular disease of the heart.

Another man, aged 41, with gonorrhœa, died from cellulitis of the scrotum.

A woman, age 36, admitted for gonorrhœa, died of pericarditis, peritonitis and thrombosis of the inferior vena cava.

TUMOURS.

A man of 63, with an epithelioma of the larynx, died of exhaustion a few days after admission.

Sixteen men and two women were admitted for epithelioma of the œsophagus; of these, seven men and one woman died.

A man, aged 67, died a few hours after admission of jaundice produced by a malignant stricture of the common bile duct.

A woman, aged 43, died of scirrhus of the breast, no operation having been performed. At the post-mortem extensive secondary growths were found in the thorax and elsewhere.

A woman, aged 57, died shortly after admission of peritonitis following rupture of a disturbed cæcum. The distension was caused by malignant disease of the sigmoid flexure.

A man, aged 58, died of carcinoma of the kidney; there were numerous secondary growths.

A man, aged 74, was admitted with carcinoma of the rectum, and died shortly afterwards. At the post-mortem it was found that perforation of the cæcum had taken place.

A woman, aged 45, admitted with carcinoma of the rectum and septicæmia, died a few days afterwards.

A boy, aged 14, died of secondary sarcoma of the scapula, lungs and ribs; amputation of the arm for primary sarcoma of the humerus had been performed some months previously.

A man of 60 died of secondary sarcoma of the lung, kidney, and lymphatic glands; the primary growth had been in the arm, and had been removed by amputation.

A woman, aged 30, died a fortnight after admission for a large abdominal sarcoma, subsequently found to have originated in the supra-renal capsule.

MALFORMATIONS AND DEFORMITIES.

Two infants with imperforate rectum died, one week and seven weeks respectively, after inguinal colotomy. Another child died with convulsions the day after admission.

A rickety infant, admitted for phimosis, died of diarrhoea.

An infant of 12 days was admitted with extravasation of urine, due to phimosis, and died on the following day.

Two children with spina bifida died of spinal meningitis; one was admitted after the sac had ruptured, one was injected with Morton's fluid.

DISEASES OF THE NERVOUS SYSTEM.

A man, aged 42, who had been in the hospital several times for fractures and tabes dorsalis, died eventually of cancer of the rectum and liver.

DISEASES OF THE EAR.

Of 34 patients admitted with otitis media five died of intra-cranial complications.

DISEASES OF THE LARYNX AND TRACHEA.

A man, aged 22, died suddenly of œdema of the glottis a few minutes after admission to the hospital. The cause of the œdema was not clearly proved.

A man, aged 53, and a woman, aged 22, died of tubercular disease of the larynx and lungs.

DISEASES OF THE CHEST.

An infant died of pleural effusion shortly after admission.

DISEASES OF THE LYMPHATIC SYSTEM.

A man, aged 47, admitted for lymphangitis and abscesses of the leg, died of heart disease and pericardial effusion.

DISEASES OF DIGESTIVE SYSTEM.

An infant of 13 months died of cancrum oris on the day after admission.

A woman, aged 53, was admitted with gangrenous stomatitis, of which she died soon afterwards. There was no post-mortem examination.

A woman, aged 40, died of fibrous stricture of the pylorus. She was not in a condition suitable for any operation.

A man, aged 38, with deep jaundice and distension of the gall bladder, due to cancer of the head of the pancreas, died on the second day after admission.

The number of cases of reducible hernia, 110, admitted into the hospital during the year is considerably greater than the number, 43, admitted during the previous year. This is chiefly due to the greater frequency with which operations for radical cure have been performed. The number of cases of irreducible hernia has risen from 17 to 29.

A man of 66, with a strangulated hernia of four days' duration, died within a few minutes of admission.

Another man with strangulated hernia refused operation and died on the day after admission.

A woman, aged 47, admitted with a strangulated umbilical hernia and in a state of coma, was not operated upon, and died shortly after admission. At the post-mortem symmetrical abscesses were found in the corpora striata, and one of these had ruptured into the lateral ventricle.

An infant of 9 months, with intus-susception, recovered after inflation.

DISEASES OF THE GENITO-URINARY ORGANS.

A man, aged 36, died a few days after admission for renal calculus. At the post-mortem stones were found in both kidneys.

Two men, aged 70 and 73, died of enlargement of the prostate and cystitis.

A man, aged 63, with tubercular testes, died of pulmonary phthisis.

A man, aged 36, died of stricture, cystitis and heart disease.

A man, aged 43, with extravasation of urine, due to stricture, died four days after admission.

A child of 4, with ulceration of the vulva of a doubtful nature, died on the day after admission.

ORGANS OF LOCOMOTION.

A man, aged 47, with caries of the malar and lower jaw, died under chloroform.

Two men, aged 21 and 27, and a woman, aged 20, died of long-continued suppuration, due to caries of the spine.

Of 42 patients with necrosis of various bones, only one died; this was a man, aged 49, with necrosis of skull and diffuse suppurative meningitis.

Among 34 patients with periostitis, osteitis and epiphysitis, there were no deaths.

A man, aged 43, with Charcot's disease of both ankles and ulcers of the foot, died of exhaustion.

Among 158 patients with tuberculous diseases of joints, there were six deaths. Two men, aged 29 and 70, with disease of sacro-iliac and hip joints respectively, died of prolonged suppuration. An infant with hip disease died of diphtheria. Three other deaths occurred after arthrectomy or excision.

ABSCESS.

A male infant of 15 months, with a cervical abscess, died of tubercular meningitis.

A man of 60, admitted with suppuration about the back and septicæmia, died a few days after admission.

A man, aged 60, died with prostatic abscess and cystitis.

A female child, aged 2, admitted for a cervical abscess, died of meningitis and thrombosis of the lateral sinus.

Three adult women died of lumbar abscess, perinephritic abscess, and mammary abscess respectively. The last had septicæmia.

DISEASES OF THE CUTANEOUS SYSTEM.

Two feeble infants with eczema died of marasmus and pulmonary collapse.

An infant of two months with molluscum fibrosum died of diarrhoea soon after admission.

A feeble infant, aged one year, died of varicella gangrenosa.

BURNS AND SCALDS.

Thirty patients were admitted for burns ; of these six male and ten female patients died ; they were nearly all young children.

Of thirty-five patients admitted for scalds three died ; all three were very young children.

INJURIES OF THE HEAD.

A man, aged 69, admitted with concussion of the brain, died three days afterwards. No post-mortem examination was allowed.

A child of 11 months, admitted for injury to the head, developed a cephalhydrocele shortly afterwards.

Twenty-four male, and two female patients were admitted for fracture of the base of the skull ; of the former fourteen recovered, nine died within twenty-four hours of admission, one died of septic pneumonia five days after admission.

A child, aged 7, and a woman, aged 75, both of whom had been run over, died a few hours after admission.

A boy, aged 8, died of meningitis, eleven days after sustaining a severe compound fracture of the frontal bone. At the post-mortem it was found that the fracture extended into the base of the skull.

INJURIES OF THE ABDOMEN.

A child, aged 5, fell from a third-floor window, and died two days afterwards from injury to the abdominal viscera. No post-mortem allowed.

A man, aged 20, fell a distance of eight feet on to a broom handle, which penetrated the rectum and abdomen, and ruptured the liver. He died of peritonitis.

A man, aged 32, was admitted with a punctured wound of the abdomen which caused death in two days. At the post-mortem neither peritonitis nor any wound of viscera were found.

A boy, aged 13, died a few hours after having been kicked on the abdomen. A laceration of the jejunum was found post-mortem.

A railway porter and a school boy died of rupture of the liver, within a few hours of admission ; the former had been crushed by buffers, the latter run over.

INJURIES OF THE THORAX.

A man, aged 23, lived one hour after shooting himself through the right ventricle of the heart.

A man, aged 41, who had shot himself through the lung, stomach and kidney, discharged himself on the eighteenth day. He was then nearly well.

A woman, aged 28, committed suicide by placing gunpowder in her mouth, and lighting it. The œsophagus was blown open into the pleura, and the patient died a few hours after admission.

Three men and one woman died of fracture of the ribs, complicated with injury to the lungs or other viscera.

A farrier, aged 43, was trodden on by a horse, and died of fracture of the sternum and injuries to the thoracic viscera.

A woman, aged 27, died two hours after admission of fracture of the sternum and other severe injuries caused by jumping out of a window.

INJURIES OF THE NECK.

Of seven patients admitted for cut throat, only one died, a man aged 59.

INJURIES OF THE BACK.

A man, aged 54, died, two days after admission, of fracture of the spine and other injuries.

A man, aged 44, died, six months after admission, of fracture of the lower dorsal spine.

INJURIES OF THE PELVIS.

A man, aged 50, and a woman, aged 66, died of fracture of the pelvis and other injuries.

INJURIES OF THE LOWER EXTREMITY.

Two women, aged 80 and 65, admitted for fracture of the neck of the femur, died, one of bronchitis, the other of pyuria.

A man, aged 51, died a month after admission for simple fracture of the shaft of the femur. Post-mortem, considerable disease of the kidneys and other viscera was found.

A woman, aged 48, admitted for a simple fracture of the tibia and fibula, died a few hours afterwards of hæmatemesis due to a large chronic ulcer of the stomach.

A man, aged 38, both of whose thighs had been crushed by a train died four hours after admission.

A man, aged 74, with compound comminuted fracture of both legs died shortly after admission.

TABLE II.
SURGICAL OPERATIONS PERFORMED.

OPERATIONS.		AGE AND SEX.															
		TOTAL.		Discharged.		Died.		Under 5 Years.		- 10.		- 20.		- 30.		- 40.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON THE EYE.																	
Abscission	...	4	3	4	3	...	...	1	...	3	...	...	1	...	...	1	...
Canaliculus Slit	...	3	5	3	5	...	...	...	...	...	...	2	1	...	...	...	...
Cataract—																	
Extraction...	...	27	21	26	21	...	...	1	...	...	...	2	...	...	...	2	10
Needling	...	8	...	8	...	...	...	...	...	...	...	4	...	...	...	3	...
Envisceration	...	...	2	...	2	...	...	...	...	...	...	1	...	...	...	...	...
Extirpation of Globe...	...	12	6	12	6	...	...	1	...	1	...	1	...	...	...	2	1
Foreign Body removed	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Iridectomy	...	9	15	9	15	...	...	1	...	2	1	1	...	...	...	1	5
Needling Opaque Capsule	...	7	4	7	4	...	...	...	...	...	...	...	...	...	...	2	2
Paracentesis of Anterior Chamber	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Peritomy	...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Plastic Operation on Eyelid	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Removal of Rodent Ulcer	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	2	1
Removal of Tarsal Tumours...	...	3	3	3	3	1	2	1	...
Tattooing Cornea	2	...	2
Tenotomy for Squint...	...	11	25	11	25	5	8	3	13	2	2

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[illegible]

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.															
	TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
EXCISIONS OF BONES AND JOINTS (continued)—																
Hip	1	1	...	1	1	...	1	...	...	...	...	1	...	...	...	...
Knee	4	2	4	1	...	1	...	...	...	...	2	2	1	...	...	...
Metatarso-Phalangeal—																
Joint (Great Toe) ...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Superior Maxilla ...	3	2	1	2	...	...	...	...	...	...	...	...	...	...	...	...
Inferior Maxilla ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Wrist ... ..	...	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...
OPERATIONS ON BONES.																
Osteoclasis—																
Femur—																
For Genu Valgum ...	5	7	5	7	...	...	3	2	2	...	2	3	...	...	...	...
For Genu Varum ...	...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	...
Tibia and Fibula—																
For Bow Legs ...	5	6	5	6	...	...	3	5	2	1	...	...	...	...	...	...
Tarsus—																
For Talipes	3	...	3	...	...	...	1	...	2	...	...	...	...	...	...	...
Osteotomy—																
Femur—																
For Genu Valgum ...	7	5	7	5	...	...	1	2	...	...	5	3	1	...	...	...
For Ankylosed Hip	...	2	4	2	...	...	...	...	...	...	1	2	...	...	...	...
Fibula—																
For old Fracture ...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	1	...
Tibia and Fibula—																
For Old Fracture ...	2	1	2	1	...	...	...	...	...	...	1	...	...	...	1	...

TABLE II. (continued).

[illegible]

TABLE II. (continued).

[illegible]

TABLE II. (continued).

[illegible]

TABLE II. (continued).

[illegible]

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.																	
	Total.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.		-50.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON BREAST (continued).																		
Removal of Adeno-Fibroma ...	24	...	...	24	...	...	...	...	...	...	4	...	16	...	2	...	2	...
Removal of Cysts ...	12	...	...	12	...	...	...	...	...	...	...	...	1	...	...	...	7	...
Removal of Sero-Cystic Tumour ...	2	...	...	2	...	...	...	...	...	...	...	...	1	...	...	...	1	...
Partial Amputation of Breast for Tubercular Disease and Chronic Mastitis ...	4	...	...	4	...	...	...	...	...	...	...	...	...	...	1	...	2	...
Amputation of whole Breast for Carcinoma— With Removal of Axillary Glands ...	34	...	...	31	...	...	...	...	...	...	...	...	...	...	6	...	15	...
Without Removal of Axillary Glands ...	1	6	1	6	...	...	...	...	...	...	...	...	...	...	...	2	4	...
Partial Amputation of Breast for Carcinoma— With Removal of Glands Without Removal of Glands	5	5	...	5	...	...	...	...	...	...	...	...	...	...	3	2	1	3
Local Removal of Recurrent Carcinoma— Breast ...	3	...	...	3	...	...	...	...	...	...	...	...	...	...	2	1	1	...
Glands ...	4	...	...	4	...	...	...	...	...	...	...	...	...	...	1	...	...	1

TABLE II. (continued).

[illegible]

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.																							
	TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.		-50.		-60.		-70.		Over 70.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON TONGUE.																								
Excision of Whole Tongue with Scissors	2	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Excision of One Lateral Half with Ecraseur	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Excision of one Lateral Half with Scissors	17	1	16	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Excision of Anterior Half with Scissors	5	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Local Removal of Epithelioma	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
OPERATIONS ON BURSÆ, FASCIÆ AND TENDONS.																								
Bursa Removed	3	6	3	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ganglia Incised or Removed	3	3	3	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Suture of Tendons—																								
Primary	8	1	8	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Secondary	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Palmar Fascia Divided	3	1	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tenotomy—																								
For Contracted Hamstrings	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" Fracture of Leg (old)	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" Hammer Toe	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" Talipes...	9	7	9	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
" Wry Neck	1	2	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.															
	TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON THE NOSE.																
For Deviated Septum ...	7	2	7	2	...	...	...	...	2	...	2	1	2	1	1	...
Removal of Turbinate Bone	1	1	1	1	...	...	...	...	...	...	1	...	...	...	...	...
OPERATIONS ON THE LARYNX AND TRACHEA.																
Tracheotomy—																
For Abductor Paralysis ...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
" Diphtheria and Croup	37	26	12	13	25	13	33	16	3	9	1	...	...	...	...	...
" Epithelioma of Larynx	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
" Edema of Glottis ...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
" Stenosis of Larynx ...	2	1	2	1	...	...	1	...	1	...	...	...	...	...	...	...
" Stenosis of Trachea ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
" Tubercular Laryngitis	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...	...
Thyrotomy—																
For Epithelioma of Larynx	2	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...
" Stenosis of Larynx ...	1	...	1	...	...	...	1	...	...	...	...	...	1	...	...	...
OPERATIONS ON NERVES.																
Excision of Bulb of Nerve ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Freeing Median Nerve from Scar ...	1	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...

TABLE II. (continued.)

OPERATIONS.		AGE AND SEX.															
		TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.	
		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON THE VASCULAR SYSTEM (continued).																	
Ligature of Common Femoral for Punctured Wound	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Ligature of Internal Jugular Vein for Suppurative Thrombosis	3	...	...	1	...	2	...	1	...	...	...	2	...	...	...	...	...
Ligature or Excision of Varicose Veins	21	7	...	21	7	...	...	...	...	...	...	4	...	11	4	2	1
Excision of Cirroid Aneurysm of Scalp	...	1	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...
OPERATIONS ON GENITO-URINARY ORGANS.																	
Circumcision	57	...	...	56	...	1	...	3	...	6	...	16	...	21	...	5	...
Nephrotomy	4	...	...	3	2	1	...	...	...	1	...	...	1	...	1	1	...
Nephrectomy—(Abdominal)	2	1	...	...	...	2	...	1	...	...	...	...	...	...	...	...	...
(Lumbar)	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Nephro-lithotomy	1	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...
Nephrography	1	3	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...
Lithotripsy	6	...	...	6	...	...	...	3	...	...	...	...	...	...	...	1	...
Lithotomy—(Supra-pubic)	7	...	...	6	...	1	...	1	...	2	...	1	...	...	...	...	...
(Lateral)	2	...	...	2	...	...	...	...	...	2	...	...	...	...	...	3	...

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.															
	TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
OPERATIONS ON GENITO-URINARY ORGANS (continued).																
Extraction of Vesical Calculus per Urethram ...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Cystotomy— (Lateral)—	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For Cystitis ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
(Median)—	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For Foreign Body ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
(Supra-pubic)—	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For Tumour ...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...
(Deploratory) ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Partial Removal of Prostate ...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cauterisation of Prostate ...	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Castration—	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
For Retained Testis ...	3	...	3	...	...	...	...	...	...	...	2	...	...	...	1	...
" Sarcoma ...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	1	...
" Syphilis ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
" Tubercular Disease ...	5	...	5	...	...	...	...	...	...	...	...	...	2	...	2	...
Transplantation of Retained Testis ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Ligature of Varicocele—	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
(Open Method) ...	14	...	14	...	...	...	...	...	...	...	9	...	3	...	2	...
(Subcutaneous) ...	25	...	25	...	...	...	...	...	...	...	12	...	11	...	1	...
Injection of Hydrocele ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Incision or Excision of Tunica Vaginalis for Hydrocele ...	3	...	3	...	...	...	...	...	...	...	1	...	2	...	...	...

TABLE II. (continued).

[illegible]

TABLE II. (continued).

[illegible]

TABLE II. (continued).

OPERATIONS.	AGE AND SEX.															
	TOTAL.		Discharged.		Died.		Under 5 Years.		-10.		-20.		-30.		-40.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
ABDOMINAL SECTION (continued).																
For Perforative Peritonitis ..	2	...	...	...	2	...	...	...	...	...	...	...	...	...	1	...
For Blood Cyst of Abdomen ..	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
For Intus-susception— <i>Reduction of Intus-susception</i>	3	2	3	2	...	...	3	2	...	...	...	...	...	...	...	...
<i>Excision of Intus-susception</i>	1	1	...	...	1	...	1	1	...	...	...	...	...	...	...	...
For Intestinal Obstruction (Acute) ...	5	3	...	1	5	2	1	...	1	...	1	...	...	...	...	...
For Strangulated ... Hernia <i>Reduced en masse</i> ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
For Appendicitis ...	4	...	1	...	3	...	1	...	...	...	1	...	...	...	...	...
For Extra Uterine Pregnancy	...	4	...	3	...	1	...	...	...	...	...	...	...	...	...	...
For Pelvic Hematocle	...	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...
Cholecystotomy ...	1	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...
Enterectomy*— <i>For Carcinoma</i> ...	1	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...
Gastrostomy ...	2	2	...	1	2	...	...	...	...	...	...	...	...	...	...	...
Hysterectomy— <i>Vaginal</i> ...	...	3	...	3	...	...	...	...	...	...	...	...	...	...	...	...
Ovariectomy ...	...	37	...	30	...	...	...	...	...	...	2	...	...	...	...	...
Exploratory— <i>For Penetrating Wound of Abdomen</i> ...	1	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...
<i>For Malignant Disease—</i> <i>Of Intestine</i> ...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...
" <i>Kidney</i> ...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...
" <i>Pylorus</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>For Dysmenorrhœa</i> ...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...
<i>For Uterine Hemorrhage</i> ...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...

* Other cases also under Intus-susception and Strangulated Hernia.

STATISTICS OF ANÆSTHETICS.

During the year 1893 Anæsthetics were administered 5,477 times.

Chloroform	...	...	...	...	...	...	2,524 times.
Nitrous Oxide Gas	...	...	...	...	...	...	1,516 „
Ether	...	...	...	...	...	...	1,420 „
Gas and Ether	...	...	...	...	...	...	17 „
Total	...	...	...	...	...	...	<u>5,477</u> „

A man, aged 47, with caries of the malar bone and lower jaw died under chloroform.

An out-patient, a boy aged 17, was put under chloroform for the removal of adenoids. The operation was completed without any abnormal symptom. At the end of five minutes the patient suddenly became white ; no pulse could be felt, but respiration continued without assistance. The respiration gradually failed, and although artificial means were resorted to the pulse never returned. Post-mortem nothing abnormal was found. The boy had been accustomed to fainting fits.

APPENDIX TO TABLE II.

EXCISIONS OF BONES AND JOINTS.

A child, aged 3, was admitted with hip disease and a large abscess. Excision of the hip was performed, but the patient died on the twenty-fourth day with pulmonary disease. There was no post-mortem.

A girl, aged 16, died of exhaustion and amyloid disease three weeks after excision of a tubercular knee; the disease had existed for ten years.

Excision of the knee was performed in two other cases of tubercular disease, and in three of ankylosis, in all cases successfully.

A man, aged 55, died of shock after removal of the upper jaw for sarcoma.

A man, aged 74, died of exhaustion three days after removal of the upper jaw for epithelioma. Two women and one man recovered after similar operations.

OPERATIONS ON BONES.

Resection of a part of one or more ribs was performed 28 times with uniform success. In one case it was done to obtain access to a hydatid of the liver; in all the others empyema was the cause of the operation.

Osteoclasis by Réclard's osteoclast was performed for the first time upon the foot in cases of talipes. The results obtained were not very encouraging.

An infant, age 1 year, was admitted with otitis media and tubercular meningitis; an exploratory operation upon the mastoid was performed without success.

A boy, aged 4, died of suppurative thrombosis of the lateral sinus a few hours after trephining of the mastoid had been performed. At the post-mortem it was found that the thrombosis extended as low as the middle of the left innominate vein.

A man, aged 40, was admitted in an unconscious condition, with symptoms pointing to cerebral abscess; he was trephined and the abscess opened, but death ensued a few hours later.

OPERATIONS ON JOINTS.

A man, aged 21, died three days after arthrectomy of a tubercular knee. A post-mortem showed only a fatty liver and some old perihepatitis.

AMPUTATIONS FOR INJURY.

A boy died after an amputation for crushed hand and forearm.

A man, aged 65, died after a secondary amputation for compound fracture of the leg, with rupture of the anterior tibial artery.

AMPUTATIONS FOR DISEASE.

Among sixty-two cases there was only one death, that of a man, aged 62, who underwent amputation through the thigh for gangrene of the leg. He was in extremely bad condition before the operation, and died a few hours afterwards.

OPERATIONS ON BREAST.

Three women died after amputation of the breast and removal of glands from the axilla. All were over 60 years of age: one had been subject to bronchitis for some years.

REMOVAL OF TUMOURS.

A man, aged 66, died of venous hæmorrhage and shock a few hours after enucleation of a large thyroid cyst. No post-mortem could be obtained.

A man, aged 67, died of pneumonia a month after removal of a recurrent epithelioma of the floor of the mouth, together with part of the lower jaw. At the post-mortem secondary growths were found in the kidneys and liver.

A woman, aged 34, died of general lympho-sarcoma six weeks after removal of one of the affected glands from the groin.

A woman, aged 49, died of hæmorrhage after removal of a sarcoma of the parotid gland.

OPERATIONS ON THE TONGUE.

A man, aged 50, died of gangrenous pneumonia a month after removal of the whole tongue for epithelioma.

A man, aged 50, died of pneumonia fifty-four days after removal of half the tongue for epithelioma.

Twenty-two patients recovered after removal of one half or the whole of the tongue for epithelioma.

In two cases portions of the tongue were removed for papilloma, and in one case an epithelioma was excised locally.

OPERATIONS ON LARYNX AND TRACHEA.

Tracheotomy for croup and diphtheria was performed sixty-three times; thirty-eight of these patients died, twenty-five recovered.

A man, aged 57, was admitted with an aneurism of the arch of the aorta, causing much dyspnoea and double abductor paralysis; tracheotomy was performed without any benefit.

An elderly man, upon whom tracheotomy was performed for epithelioma of the larynx, died some months afterwards of extension of the disease.

Tracheotomy was performed upon a man, aged 26, with œdema of the glottis following a recent burn, but the man died of shock some hours later.

A woman, aged 22, died of advanced tubercular disease of larynx and lungs shortly after a tracheotomy.

Thyrotomy was performed twice for epithelioma of the larynx; one patient died six months later of extension of the disease, the other recovered sufficiently to leave the hospital.

LIGATURE OF ARTERIES.

The external iliac artery was tied successfully for femoral aneurism in a man whose opposite femoral had previously been tied for aneurism on the other side.

The superficial femoral artery was tied twice for popliteal aneurism. One patient, a man aged 30, recovered completely; the other case was that of a man, aged 51, in very bad health, who was admitted with a leaking aneurism in Hunter's canal. The patient died with gangrene of the leg on the seventeenth day after the operation. The common femoral artery was successfully tied for a recent and severe wound of that vessel.

Ligature of the internal jugular vein was performed three times for intracranial complications of ear disease, two patients died, and one, who also had empyema, recovered.

OPERATIONS ON GENITO-URINARY ORGANS.

An infant, aged 12 days, was admitted with extravasation of urine due to phimosis, and died on the following day after circumcision.

Nephrotomy was performed seven times; as an exploratory operation, four times, all the patients recovering; for hydronephrosis twice, one patient died: he was a man, aged 33, who was admitted for profuse hæmaturia from a huge hydronephrotic cyst. Death ensued on the day after operation, and was found at the post-mortem to have been due partly to hæmorrhage, and partly to a communication which existed between the wound and an unsuspected abscess cavity containing foul pus and urine. Nephrotomy was also performed once for tubercular kidney, upon a girl, aged 13, who died of suppression of urine on the sixth day afterwards. No post-mortem was allowed.

Nephrectomy through a lumbar incision was performed with success for sarcoma of the kidney, upon a man, aged 53.

A man, aged 44, died after removal of a large hydronephrotic and calculous kidney, by abdominal operation.

A woman, aged 35, and a boy, aged 2½ years, died several weeks and six days respectively, after abdominal nephrectomy; in both cases secondary deposits were found after death. In the latter case the immediate cause of death was intestinal obstruction.

Supra-pubic lithotomy was performed seven times; one patient, a man, aged 67, who had also enlargement of the prostate, died with suppuration between the bladder and prostate.

A man, aged 65, upon whom lateral cystotomy was performed for the relief of cystitis, died of pyonephrosis and cystitis.

Two elderly patients died after local operations upon the prostate.

OPERATIONS ON THE RECTUM AND ANUS.

A woman, aged 27, died five days after division of a fibrous stricture of the rectum. There was no post-mortem.

A woman aged 23, died of secondary hæmorrhage, after excision of the rectum.

MISCELLANEOUS OPERATIONS.

A man, aged 60, died of apoplexy shortly after the removal of a tubercular gland from the neck.

Forty-eight patients recovered after erosion or excision of tubercular glands.

An infant, aged 5 months, died of spinal meningitis after injection of a spina-bifida with Morton's fluid.

Transfusion was performed twice for uterine hæmorrhage, and once after an operation for resection of gangrenous intestine, but without success.

OPERATIONS FOR HERNIA.

Herniotomy for strangulation was performed twenty-six times, with eleven deaths. Of the fatal cases, in five the operation was done on women for femoral hernia; in all these there was gangrene of the intestine; one case was treated by resection of the gangrenous gut by Senn's method. The ages of the patients were 50, 55, 60 (resection), 62 and 66. In three fatal cases the operation was done for inguinal hernia upon male patients, aged 3 weeks, 35, and 61 years respectively. In none of these cases was there gangrene of the intestine, but in the last case there was rupture of the serous coat apparently produced by violence applied before the patient came to the hospital.

One man, aged 83, was operated upon twice successfully during the year.

The three remaining fatal cases were of umbilical hernia in women, aged 44, 53, and 63 respectively. In one of these the intestine was gangrenous, and was resected.

In none of the cases that recovered after herniotomy was the intestine actually gangrenous, although in some cases, and notably in one of four days' strangulation, the condition of the gut at the time of operation was far from promising.

The operation for radical cure of non-strangulated hernia was performed 102 times upon 78 male and 24 female patients.

Two patients died; one was a boy, aged 8, who had previously undergone an operation for the radical cure of the same hernia at another hospital. He died of acute peritonitis. At the post-mortem it was found that at the first operation a Meckel's diverticulum had been cut off and sutured, that some of the sutures were still attached to the intestine, and that the disturbance of the parts at the time of the second operation had made a communication between a septic cavity and the general peritoneal cavity.

The other fatal case was that of a man, aged 40, who died of bronchitis a month after an operation for the radical cure of a small irreducible omental epiplocele.

COLOTOMY.

A man, aged 51, died on the eighth day after an inguinal colotomy for malignant disease; the cause of death was peritonitis, some of the stitches having given way on the sixth day.

A woman, aged 38, died of exhaustion nine weeks after the operation, which was done for obstruction.

Two other elderly women died shortly after operations for obstruction.

An infant died of exhaustion seven weeks after a colotomy for imperforate anus.

Another infant died a few days after a similar operation.

Fifteen patients recovered after inguinal colotomy ; twelve at least of these operations were performed for malignant disease.

Lumbar colotomy was not performed at all during the year.

ABDOMINAL SECTION.

A man, aged 35, died of peritonitis, set up by ulceration of the rectum caused by a gallipot that he had introduced into that cavity. It could not be extracted until a free division of the sphincter had been made and a hand introduced into the abdominal cavity from above.

Two cases of hydatid of the liver, and one of hydatids of the peritoneum, recovered after abdominal section and drainage.

A man, aged 31, died after abdominal section for suppurative peritonitis, due to the rupture of a subdiaphragmatic abscess connected with an old gastric ulcer.

A child, aged 6, died after abdominal section for acute intestinal obstruction caused by tubercular peritonitis.

A man, aged 60, died of malignant disease of the rectum sixty-eight days after laparotomy for chronic obstruction and localised peritoneal abscess.

A girl, aged 4, died of collapse after an operation for purulent peritonitis.

Two men, aged 36 and 73, died after laparotomy for intestinal obstruction; in both cases the bowel had burst before the operation could be done.

A large blood cyst of the abdomen, of uncertain nature, was opened and drained with complete success.

The abdomen was opened for intus-susception seven times ; in five cases the intus-susception was reduced ; all these cases recovered. Three of these patients were under one year of age. Two infants, aged 6 months and 7 months, died after laparotomy and excision of the intus-susception.

Five men and two women died after laparotomy for acute intestinal obstruction, due to divers causes.

A man, aged 30, recovered after an abdominal section for an inguinal hernia that had been reduced *en masse* before the patient came to the hospital.

A man, aged 49, died a few hours after abdominal section and enterotomy for obstruction, due to ulceration of the appendix and faecal abscess.

A boy, aged 4, died a few hours after abdominal section for strangulation of the small intestine by an ulcerated and adherent vermiform appendix.

A youth, aged 17, died after an abdominal section for peritonitis and abscess due to appendicitis.

Of four cases operated upon for extra-uterine pregnancy, three recovered, one died. At the time of operation the latter patient was in a state of extreme collapse from hæmorrhage, from which she never rallied.

Two cases of pelvic hæmatocele, one of which was suppurating, were opened and drained successfully.

Cholecystotomy was performed twice; once on a patient, aged 36, for removal of gallstones: she made a good recovery; once on a man, aged 38, who was admitted very ill with distension of the gall-bladder and deep jaundice, due to malignant disease of the pancreas. The gall bladder was opened, but the man died on the following day.

Enterectomy was performed five times. A man, aged 33, recovered after removal of the cæcum and part of the ascending colon for carcinoma. Four other patients who underwent resection of gangrenous gut in connection with intus-susception and strangulated hernia have already been mentioned.

Gastrostomy was performed four times.

A woman, aged 37, recovered completely, and was known to be alive and well several months after she left the hospital.

A man, aged 53, died thirty-two days after the operation; at the post-mortem it was found that the malignant disease had penetrated the trachea in two places and set up septic pneumonia.

A man, aged 54, and a woman, aged 49, died within a few days of the operation.

The primary cause of the operation in the three last cases, and probably also in the first, was malignant disease of the œsophagus.

Vaginal hysterectomy for carcinoma of the uterus was performed three times; in another case it was attempted but could not be completed. All four patients recovered.

There has been a considerable increase in the total number of ovariectomies performed during the year.

Seven patients died; of these one had a foetid suppurating cyst adherent in the pelvis. One was an elderly patient who was suffering from calculous pyonephrosis at the time of operation. At the post-mortem the stump had soundly healed, and the peritoneum was quite healthy. In two, acute peritonitis, due to rupture of the cyst, was present at the time of operation. In one case the patient did well until the eleventh day, when symptoms of acute intestinal obstruction set in, for which a secondary laparotomy was performed. The patient died twenty-four hours later. One was a case in which the ovarian cyst had been opened and drained in the loin some months before the patient came to the hospital. An unhealthy sinus was present at the time of operation. One case died from peritonitis.

Abdominal section was performed six times as an exploratory operation for diagnostic purposes. Two of the patients on whom it was done died of malignant disease some weeks later. A girl, aged 22, with disease of the pelvic viscera died of peritonitis. A man, aged 20, was admitted with a punctured wound of the abdomen and rupture of the rectum and liver, caused by falling on to a broom handle. An exploratory laparotomy showed that fæces had escaped into the peritoneal cavity and that the case was a hopeless one.

SUB-TABLE, SHOWING THE NUMBER OF CASES OF ERYSIPELAS, PYÆMIA, &c.,
IN THE SURGICAL WARDS.

DISEASES.	Under 5.		5—10.		10—20.		20—30.		30—40.		40—50.		50—60.		60—70.		70—80.		TOTAL.		Deaths.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
CUTANEOUS ERYSIPELAS—																						
Admissions ...	9	4	3	1	15	11	7	11	10	7	17	5	1	13	..	1	2	..	64	53	5	3
Occurring in Hospital ...	..	1	..	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..	2	2	..	..
Occurring after operation ...	..	1	..	..	1	..	..	1	..	1	1	..	1	..	..	..	..	..	3	3	..	..
PHLEGMONOUS ERYSIPELAS AND CELLULITIS—																						
Admissions ...	3	2	..	1	7	5	13	8	17	6	18	3	9	3	2	..	..	1	70	31	8	2
Occurring in Hospital ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..
Occurring after operation ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
PYÆMIA AND SEPTICÆMIA—																						
Admissions ...	2	..	..	..	1	..	..	1	..	..	1	1	1	1	..	..	..	..	6	3	4	1
Occurring in Hospital ...	..	..	..	..	1	..	..	1	..	..	..	..	1	..	..	..	..	..	2	1	2	1
Occurring after operation ...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2	..	..
DELIRIUM TREMENS—																						
Admissions ...	..	..	..	..	..	..	..	..	3	1	1	..	..	..	..	..	1	..	5	1	2	..
Occurring in Hospital ...	..	..	..	..	..	..	..	..	1	..	3	..	..	..	..	..	..	..	5	..	..	..

APPENDIX TO SUB-TABLE OF CASES OF ERYSIPELAS, &c.

ERYSIPELAS—Cutaneous.

Admissions.

Five male and three female patients died : one, a child of 10 months, died of pyæmia : the others were all over 35 years of age.

One woman died suddenly of heart disease, another of pneumonia.

Of the men, two had also delirium tremens, and died shortly after admission ; one died two days after admission—the fourth, who was admitted with cellulitis about an ulcer of the foot, died of tabes dorsalis after a long illness.

Occurring in Hospital.

Two male and two female patients developed cutaneous erysipelas after admission for a wound of the scalp, otitis media, an abscess of the breast, and cancrum oris. All recovered.

After Operations.

In two men after operations for necrosis ; in another after removal of a papilloma of the tongue. In an infant after an operation for recto-vaginal fistula, and in two women after removal of tumours from the breast and axilla respectively. All six patients recovered.

Phlegmonous.

Admissions.

Eight male and two female patients died ; a boy, aged 2, died of acute miliary tuberculosis five days after admission for cellulitis of the penis and scrotum. The others were all over 40 years of age. One died of cerebral abscess, the remainder of pneumonia or some other visceral complication.

Occurring in Hospital.

In three men, over 40 years of age, admitted for abscess of the leg, compound fracture of the leg, and stricture. All recovered.

After Operations.

No cases occurred.

PYÆMIA AND SEPTICÆMIA.

Admissions.

In two cases with otitis media, in one with cellulitis of the arm, in one with erysipelas, in one with facial carbuncle, in one with carcinoma of the rectum.

Occurring in Hospital.

In one case after removal of an epithelioma of the tongue, in another after amputation of a crushed hand.

Occurring after Operation.

In two cases after amputation of the breast. In one of these there was considerable ulceration of the skin before operation.

DELIRIUM TREMENS.

Admissions.

In five cases accompanying erysipelas, in one after fracture of the pelvis.

Occurring in Hospital.

In two cases of fracture of the leg, in one of cut-throat, in one of abscess of the neck, and in one of erysipelas.

TABLE OF AMPUTATIONS WITH THE PERCENTAGE OF DEATHS DURING THE TEN YEARS
from 1884 to 1893 inclusive.

OPERATIONS.	CASES UNDER TREATMENT.										PERCENTAGE OF DEATHS.										Total Number of		Average Per-centage of Deaths.
																					Cases	Deaths	
	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.			
PRIMARY—	...	2	2	2	2	2	2	2	1	1	2	1	50	100	...	50	100	100*	50	...	18	9	50
	1	3	2	...	33	100	66	50	...	...	1	...	...
	...	2	3	1	3	2	1	1	2	1	...	...	...	...	...	...	100	...	...	22	5	22
	...	3	...	1	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	6	1	16
	50	100	...	...	...	...	...
	4	2	2	2	2	1	6	1	2	1	25	...	...	...	...	...	...	18	3	16	
	...	4	2	3	2	4	1	2	3	50	33	21	2	9
SECONDARY—	...	1	5	...	...	4	1	3	...	...	...	2	...	66	...	25	100	33	...	16	4	25
	...	1	3	2	1	1	1	...	...	...	2	...	...	...	...	...	...	...	...	11	3	27
	...	2	...	...	1	1	1	...	1	1	1	...	...	...	...	...	...	...	100	7	1	14
	3	1	...	2	2	...	...	...	...	...	...	...	...	...	...	...	...	8	...	...
	
* Foot also amputated.																							

* Foot also amputated.

OPERATIONS.	CASES UNDER TREATMENT.										PERCENTAGE OF DEATHS.										Total Number of Cases.	Deaths.	Average Per- centage of Deaths.	
	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.				
FOR DISEASE—																								
Hip-Joint	3	1	3	..	1	..	..	..	1	1	33-33	100.	66-66	..	..	..	..	..	..	..	10	4	40.
Thigh	27	20	12	25	15	13	7	13	14	10	18.	10.	..	12.	13-33	7-69	14-28	7-69	14-2	10.	156	21	13-4	
Knee-Joint	..	1	..	1	1	1	..	2	2	1	100.	..	..	..	..	..	..	..	..	..	10	1	10.
Leg	..	3	4	8	5	7	4	6	6	11	33-33	50.	..	20.	14-28	14-28	..	..	..	..	61	6	9-8
Ankle-Joint	..	7	11	9	11	6	1	6	4	5	..	..	22-22	9-09	..	..	16-66	..	..	..	60	4	6-6
Shoulder-Joint	..	2	1	1	1	1	..	..	3	1	..	100.	..	..	..	..	..	..	33-33	..	10	2	20.
Arm	..	..	1	4	2	..	5	4	2	1	..	..	25.	..	..	..	..	..	..	..	21	1	4-7
Forearm	..	4	5	5	2	4	..	..	4	1	..	100.	20.	..	..	..	..	..	..	..	27	3	11-1



